ATARI ST Special Section

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Antic®

The ATARI® Resource

NOVEMBER 1985 VOLUME 4, NUMBER 7

NEW COMMUNICATIONS

Ian Chadwick Maps 130XE
Shortwave Radio Atari
Universal Graphics Filemaker
TYPO II With Everything
ST Hookup For IBM Disks

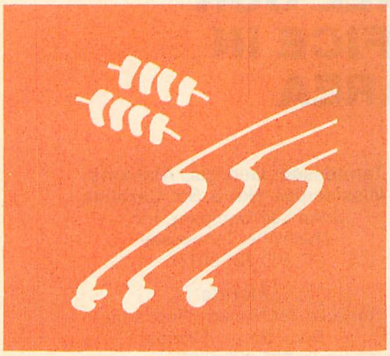


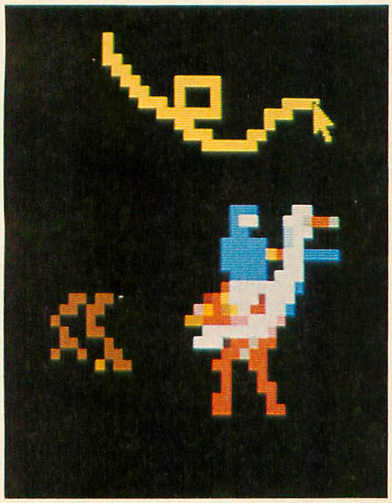
INSIDE: 8 Type-In Programs

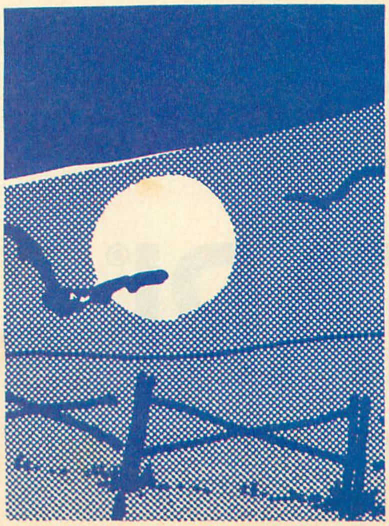

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ST SECTION

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i/o board

DISKIO 2.5?

Ever since you printed "DISKIO" (**Antic**, January 1985), I've been using it on all my disks and loving it. However, now I'm converting all my disks to DOS 2.5 and DISKIO is not compatible. I'd hate to give it up. Is there some way to remedy this situation?

Brian Patrolia
Marshfield, MA

*You're in luck. We asked the author about this and Dr. Oppenheim told us that although he was now too busy to adapt the program himself (he's a nuclear medicine physician) he would send us the source code. We then contacted Patrick Dell'Era, author of the assembly language updates Fader II (**Antic**, May 1985) and Picture Show (**Antic**, April 1985), as well as this issue's Fast Moves. Patrick accepted the challenge and we expect to see his all-new DISKIO in next month's **Antic**.*—ANTIC ED

GRAPHICS ADDITION

When I use Graphics Mode 11+32, there are a number of unwanted streaks and dots near the bottom of the screen. Other graphics modes have similar streaks. How can they be eliminated without losing whatever the +32 is intended to retain?

Nelson E. Sommer
Orchard Park, NY

*Each time you make a regular GRAPHICS call from BASIC, your screen RAM is cleared so you can start with a fresh slate. If you add 32 to your call, you tell the computer **not** to clear the screen buffer. As a result, anything that was previously on the screen remains there. The streaks and dots you see are probably leftover Graphics 0 characters. Of course, they're no longer readable because you're now in a mode with higher resolution.*

If you want to experiment with this, try filling a Graphics 2 screen with letters. Now type GRAPHICS 1+32, *and you'll see your letters shrunk down to Graphics 1 size. (Above them will be the original Graphics 2 display list.) Now, type* GRAPHICS 3+32 *and the letters become a screen of colored dots. Finally, type* GRAPHICS 2+32 *to get right back where you started.*—ANTIC ED

SHORTEST GAME

We came across this I/O submission behind a desk, while cleaning out a work station in the editorial department. Dated March 10, 1984, it's from John Pershing and Kevin O'Neil, of Falls Church, Vermont. They've probably forgotten all about it by now. Well, we're going to publish Minefield anyway—because it's the shortest code we've ever seen for a game.—ANTIC ED

```
10 REM MINEFIELD
20 REM BY PERSING AND O
'NEILL
30 REM ANTIC PUBLISHING

40 ? "K":? :? :? :POKE
752,1
50 ? "     In MINEFIELD
you have just escapedfr
om a Communist prison c
amp. You havestumbled o
nto a minefield ";
60 ? "and must     escap
e! You may interscreen
but your  object is to
get to the right edge."

65 ? "You may fire a st
olen laser that will de
stroy one pixel of a mi
ne.Be thriftyfor you on
ly have 5 shots."
70 ? "Best of luck!"
80 ? :? "Press START to
 begin."
90 IF PEEK(53279)<>6 TH
EN 90
100 C=60
1000 GRAPHICS 7:SETCOLO
R 2,0,0
1100 FOR BOX=1 TO 65:CO
LOR 2
1110 A=INT(145*RND(0))+
5:B=INT(70*RND(0)+1)
1120 PLOT A,B:DRAWTO A+
5,B:DRAWTO A+5,B+5:DRAW
TO A,B+5:DRAWTO A,B
1130 NEXT BOX
1200 N=40:COLOR 1
1210 FOR X=0 TO 158:POK
E 752,1
1215 SOUND 0,N+INT(RND(
0)*5)+1,12,5
1220 PLOT X,N
1230 IF STICK(0)=14 THE
N N=N-1
1235 IF STICK(0)=13 THE
N N=N+1
1240 LOCATE X+1,N,POO:I
F POO=2 THEN 2000
1241 IF N=79 THEN N=1
1242 IF N=0 THEN N=78
1243 IF STRIG(0)=0 AND
O<=4 THEN 3000
1250 NEXT X
1260 ? "YOU FINISHED!!"
:C=C+20:R=R+1
1270 ? "PRESS FIRE BUTT
ON":O=0
1273 ? "YOU FINISHED ";
R;" ROUND(S)"
1275 SOUND 0,0,0,0
1280 IF STRIG(0)=1 THEN
 1280
1290 GOTO 1000
2000 FOR I=29 TO 243:SO
UND 0,I,8,10:NEXT I
2010 ? "YOU COMPLETED "
;INT(X/158*100);"% OF M
INEFIELD"
2020 GOTO 1270
3000 G=X
3010 COLOR 1:PLOT G,N
3015 SOUND 1,G,10,5
3020 LOCATE G+1,N,KO:IF
 KO=2 THEN 3050
3030 G=G+1:IF G=158 THE
N 3050
3040 GOTO 3010
3050 COLOR 0:PLOT X+1,N
:DRAWTO G+1,N
3055 SOUND 1,0,0,0
3060 O=O+1:G=0:COLOR 1:
GOTO 1250
```

VIDEO OVERSEAS

I have some good news for Atari users who (like myself) work overseas. The newest generation of Japanese television sets (JVC, Sharp, Sanyo, Sony, etc.) sold in Europe and the Middle East are Multi-System. They can be used anywhere in the world with any TV signal—PAL or NTSC—and any voltage.

I have had no problems with my JVC 7-System TV which I bought in the Middle East. I used it for one year in Saudi Arabia with an Atari 800XL I bought in Holland. Then I brought the JVC back to the U.S. where I have been using it with my new Atari 130XE.

Virgil Cooper
Duncan, OK

i/o board

COLOR PRINTERS

I need help and recommendations from you and your readers. I want to buy a color printer for my school to use in our art classes to dump pictures created with the KoalaPad. Is there a printer you would recommend? What software would be best to use with this?

William Brooks
Princeton, MA

Our last review of a color printer, the Okimate, was in the April, 1985 issue. In our next issue we are reviewing the Radio Shack Color Ink Jet Printer. Color graphics dump software is not exactly plentiful for the Atari, and you should check the availability of this software carefully before purchasing any color printer.—ANTIC ED

MODEMS OVERSEAS

Can I use my modem here in West Germany to call up a stateside BBS?

Karl Stephens
West Germany

I am planning to buy a modem. As direct connect modems are not used here in Switzerland, I will have to buy a 300 baud acoustic modem. Is it possible to become a member of CompuServe's SIG*Atari. Can I log onto all those numbers you printed in your February 1985 issue (200+ Atari BBS List)?

Eric Lewis
Bern, Switzerland

We get many letters like these from our overseas readers. Telecommunications between overseas and stateside bulletin boards is only limited by the clarity of your phone signal. If you have an acoustic modem, you're more likely to pick up outside noise.

But the U.S./Europe connection is easy now because individual telephone companies throughout Europe have agreed on a standard for digital communication lines. It's called the "X.25 Network." A high quality 1200 baud data line can be accessed from most major cities simply by dialing a local number. From there you need only hook into Tymnet or Telenet, and then into the information service you wish to access.

The only difficulty is that you must have a account with the local PTT (Postal, Telephone and Telegraph) organization in the country from where you are calling. These are government owned, except for the one in the U.K. And they can be troublesome to deal with. You may have to wait some time to get the service you want, and you may find yourself paying quite high first-time connection fees. Patience is the best approach.—ANTIC ED

SHORT STORM

Here's a thunderstorm to sync with video or film. Would you please print it for your sound-effect buffs?

Alphonso Carioti
Fort Lauderdale, FL

```
2 REM THUNDER STORM
4 REM BY ALPHONSO CARIO
TI
6 REM ANTIC PUBLISHING
10 GRAPHICS 0:POKE 752,
1
15 POKE 16,64:POKE 5377
4,112
20 POSITION 12,4:? "LIS
TEN TO THE RAIN"
30 POSITION 4,6:? "PRES
S THE  SPACE BAR  FOR T
HUNDER!"
40 POSITION 3,8:? "PRES
S ANY OTHER KEY FOR RAI
N AGAIN"
50 POSITION 14,11:? "DO
N'T GET WET!!!"
100 FOR X=0 TO 245:SOUN
D 0,X,0,ABS(15-(X/8))
110 POKE 712,X:POKE 710
,X:POKE 709,X+10
120 IF PEEK(764)<>33 TH
EN POP :GOTO 100
125 SCR=PEEK(560)+PEEK(
561)*256+4:K=PEEK(SCR)
127 POKE SCR,K+(X<68)*(
INT(RND(0)*3+1)+38):POK
E SCR,K
130 NEXT X:GOTO 100
```

PICTURE PUZZLER

I would like to be able to use the picture file created by my Atari Touch Tablet to print the picture on paper. However, I have been unable to decipher the format of the picture file. I'd sure appreciate some help.

Robert A. Tims
Jonesboro, AR

*Instead of deciphering your Atari Artist picture file, try Charles Jackson's new Rapid Graphics Converter in this issue. And convert your pictures to Micro-Painter format. Now, you can use Kwik Dump by Jerry Allen (**Antic**, March 1985) to print your pictures to paper.*—ANTIC ED

MORE IN STORE

I applaud your editorial campaign urging software companies to produce Atari versions of their popular products. There is, however, an additional problem. Retail outlets refuse to carry a diverse line of Atari software. Toys 'R' Us, K-Mart and Waldenbooks (to name a few) carry a good selection for other computers, but only a minimal selection for the Atari—if they have anything at all. This seems to be as much of a problem as the refusal of developers to develop for the Atari.

Dr. William F. Smith
Bay City, MI

SOUTHERN ADDRESS

The wrong address was printed for Southern Supply Company *in the* **Antic**, September 1985 list of mail-order sources of the Atari 1020 Color Plotter. The correct address is 1879 Ruffner Road, Birmingham, AL 35210 and they also have Atari 850 Interfaces for sale.—ANTIC ED

antic online

Type GO ANTIC when you log onto **CompuServe** in October. Featured this month on ANTIC ONLINE you'll find a sneak preview of the 1985 ANTIC BUYERS GUIDE, the complete annual roundup of best products available for Atari computers.

Also featured on ANTIC ONLINE in October is an overview of how to use the new Pro-Burner EPROM cartridge burner, or how to make your own EPROM burner.

And don't forget that a complete Antic Arcade Catalog customer service system is now available on ANTIC ONLINE. Follow the Antic Central Menu Prompts to upload your queries for quick email response.

SIGNING UP

If you're not a CompuServe subscriber yet, see your local computer dealer or phone (800) 848-8199 for information about signing up. Ohio residents phone (614) 457-0802). There is no extra charge for accessing ANTIC ONLINE.

Now ANTIC ONLINE (and SIG * Atari) are also available on the **Delphi** service at a saving of $6 per hour for 1200 baud access. Phone (800) 544-4005 for information about signing up with Delphi. Massachusetts residents phone (617) 491-3393.

ONLINE NUMBERS

There have been some changes in addresses and phone numbers of commercial online services since **Antic** printed Getting Connected on page 17 of the August, 1985 issue.

BRS After Dark has a new toll-free number, (800) 227-5277. Write for BRS information to 1200 Route 7, Latham, NY 12110.

PLATO's new toll-free number is (800) 328-7104. The mailing address is P.O. Box 1305, McLean, VA 22102. Current rate is $7.75 per hour for either 300 baud or 1200 baud.

RCA Globcom would like **Antic** readers to know that it is an email and database service which can be accessed worldwide by using an Atari to emulate a telex terminal. We will cover this service in a future issue. Meanwhile you can contact RCA Globcom by phoning (800) 526-3969 or writing 201 Centennial Avenue, Piscataway, NJ 08854.

MPP LIVES ON AS SUPRA

by GIGI BISSON, **Antic** Assistant Editor

Microbits Peripheral Products (MPP), of Albany, Oregon was purchased by Supra Corp.—which is run by Alan Ackerman and John Wiley, the 22-year-old founders of MPP.

Legally, MPP went out of business. Supra bought the Microbits name from the bank that shut down MPP at the end of May and was threatening to liquidate the company's assets.

However, the MPP product line and even the brand name will live on as a Supra subsidiary. Microbits had been the top independent manufacturer of plug-in modems, printer buffers and memory expanders for Atari computers.

WARRANTY CHANGES

Supra will continue to honor the 90-day warranty for all MPP products sold *after July 1, 1985,* the date when MPP was purchased by Supra Corp. But Ackerman says that for MPP products sold earlier, "Some formerly free warranty work will now have a handling charge." Warranty repair charges vary according to the product's retail price and range from $15 to $35.

It will also be harder for users to get through to the customer service department. "Be patient," Ackerman says, "There aren't as many phone lines as before."

The new Supra customer service phone number is (312) 967-9081. New product orders may be placed at (312) 967-9075. The company has moved to smaller quarters at 1133 Commercial Way, Albany, OR 97321.

Ackerman and Wiley paint MPP as yet another victim of the computer shakeout. "It's been a tough time for some third-party Atari manufacturers, Ackerman says. "No stores were ordering anything for the old Atari computers. They're all waiting for the 520ST to come out."

Supra still plans to release the new MPP products that were under development this spring. Orders are currently being taken for the MPP 1200A plug-in 1200 baud modem and the MicroNet resource sharing network that will enable up to eight Ataris to share printers and disk drives.

September shipping was anticipated for the MicroPort expansion port. Supra says the announced 10-megabyte $800 hard disk is still on the way, although delayed. Supra offers a 20% discount for users group purchases.

ST



ST USES IBM DISK FILES

Connect a 5¼-inch disk drive

by DAVID SMALL

You can read and write IBM PC disks on your Atari ST—if you connect a 40-track, 5 1/4-inch disk drive to your 3 1/4-inch disk drive.

That's right, you could generate a data or text file at home on your ST, take the disk to work and use it directly with an IBM PC.

Are you a commercial ST programmer doing your development work on the IBM? (That's the approved method.) With this hookup, you could move files directly into the ST from an IBM disk. It's a lot faster than fooling around with the serial bus and KERMIT.

Or. . .if you don't need IBM file compatibility for your ST, you can connect a double-sided, 80-track, 5 1/4-inch drive and store 720K on a single disk.

This will save you money because 5 1/4-inch disks and drives are cheaper than 3 1/2-inch disks and drives. Atari is currently charging ST owners $199 for a single sided (SS) drive and $349 for a double sided (DS) drive.

Shopping carefully, you can pick up industry-standard 5 1/2-inch drives for under $150, complete with case and power supply.

But can you use the disk drive from your 8-bit Atari? Not if the drive is an

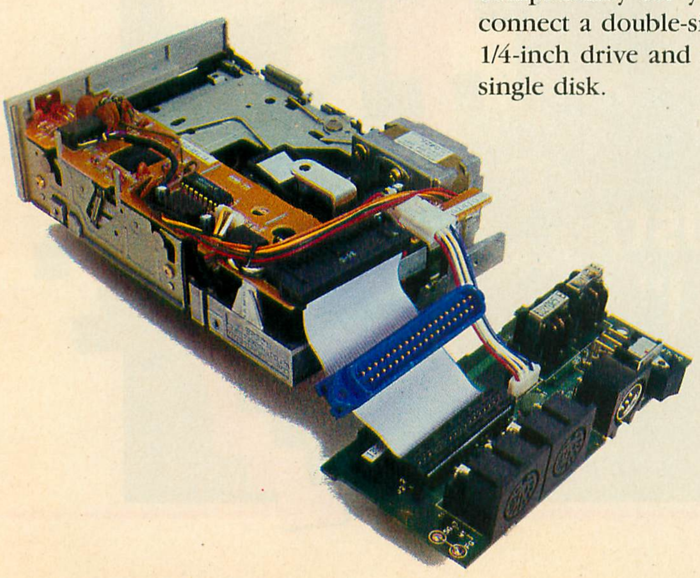


Figure 1: A 40-pin clamp-on connector creates a "tap" when attached to the 34-pin standard ribbon cable within the ST drive.

"Then I plugged the two DB-40s together . . . and I had my signals. Quick and easy."

Figure 2



810, 1050, or an Atari workalike such as an Indus, Astra, or Rana. However, ATR8000 and Percom drives will work because they are "industry standard" drives that communicate via a standard 34-pin interlace connector. Most drives for the 8-bit Ataris don't use this connector, therefore the ST will not be able to work with them.

THE WARNING

Before actually telling you how to hook up a 5 1/4-inch drive to your ST, we must caution you this is no project for electronics beginners.

While most of the work is mechanical (clamping connectors together, etc.) there is some soldering required. You also need to be familiar with the circuitry of whatever 5 1/4-inch you are using. And debugging your new system can be a frustrating experience.

Not only that, if you open up your ST drive as explained in this article, you'll violate the warranty. Probably you also will not be able to get the drive casing back on unless you cut a slot in it for the added ribbon cable.

'Nuff said, let's plunge ahead.

WHICH DRIVE?

The 5 1/4-inch drive you add can be either 40-track (for IBM compatibility) or 80-track (for more memory and greater ST compatibility). You can also choose between either a single-sided or a double-sided 5 1/4-inch drive.

I recommend a double-sided drive. There's no good reason to go through the trouble of giving your ST a single-sided 5 1/4-inch drive—unless you have already have one sitting on a shelf and are low on money. Anyway, IBM disks are usually double-sided.

Incidentally, ST hardware is set up to handle only two drives. Atari owners are used to a maximum of four drives, but there is just no way to run more than two drives on the ST.

RIBBONS AND PINS

The standard disk drive connection is either a 34-pin connector in a male/female arrangement, or an edge connector with two rows of 17 pins. In the world of standard disk drives, it is most standard to see a 34-pin ribbon cable with edge connectors clamped onto either end.

Of the 34 pins in the standard industry connector, only about 14 are really used. The Atari ST brings these 14 wires out in a short, thick cable that plugs from the ST into the first disk drive's IN connector. This cable uses a non-standard 14-pin DIN connector, but it carries industry standard signals.

Our goal is to get those signals to a standard 34-pin connector and thus to a standard disk drive.

Why did Atari choose a strange 14-pin connector? Probably two reasons. First, it's been my experience that ribbon cable connectors don't handle abuse well. They fail in a frustrating, intermittent manner—

continued on next page

which spells expense for Atari. Second, ribbon cables make wonderful broadcasting antennas, and the ST had to pass tough FCC tests. The present DIN-connector cables are tough and easily shielded.

Now, theoretically we could put a 34-pin edge connector on one end of a ribbon cable, a 14-pin DIN connector on the other end, and we'd have our disk drive cable. However, in practice I couldn't find a 14-pin DIN connector.

I tried hard. I checked the local Radio Shacks, electronic supply distributors, and so on. No one had even *heard* of a 14-pin DIN connector. Looks like another first for Atari. Right now, the only way I can think of to get this connector would be to order one from Atari. . . and they don't sell the cable as a spare part. Maybe later.

INSIDE THE DRIVE

Therefore, the method I needed to use was to tap directly into the signals inside the 3 1/2-inch ST drive. As we already warned you, this voids your warranty and will probably require you to cut a slot in the drive casing for the new ribbon cable.

If you open up the drive (use a phillips-head screwdriver and a little patience), you'll find that the 14-pin DIN connector expands to (Surprise!) an industry-standard 34-pin ribbon cable.

Of course, it does this *inside* the shielding to prevent radio noise from leaking out. A small circuit board has the two 14-pin connectors (IN and OUT) mounted on it, and it connects to the 34-pin ribbon cable inside the drive.

I put a "tap" from the 34-pin ribbon cable inside the drive to the 34-pin ribbon cable running to my remote 5 1/4-inch disk drive. (See *Figure 1.*) I then used a DB-40, 40-pin male and female clamp-on connector to clamp one side to the ST ribbon cable and the other side to the remote drive's cable. Then I plugged the two DB-40s together. . . and I had my signals. Quick and easy. (See *Figure 2.*)

You don't have to use a DB-40. Any clamp-on connector that covers the first 34 pins will work fine.

KINKY WIRING

And now, we have our disk lines. . . well, not quite. Atari does something kinky with the drive B select signal. It's on pin 6 of the DIN connector, when coming from the ST. But inside drive A it is *switched* from the IN connector pin 6, to the OUT connector pin 5, where it becomes the drive select for drive B.

This means Atari ST drives always listen on pin 5 for select, and the daisy chain scheme gives the proper drive the correct signal. Thus, the two connectors on the back of the ST drive are not interchangeable, like other Atari drives. Plug your ST into the OUT connector and the drive won't work, period.

Therefore we have to jumper from pin 6 of the DIN connector (drive B select) to pin 12 of the ribbon cable (drive B select) to get this signal across. Otherwise it doesn't show up on the 34-pin cable otherwise. This is easy to do on the bottom of the 3 1/2-inch drive's DIN connector board. (See *Figure 3.*)

Now we need to set the remote drive as drive B. Sometimes it's called drive 1 or drive 2, depending on whether the manufacturer begins numbering drives at 0 or 1.

Time out for a little theory. When a drive is idle, a five-volt signal (meaning HIGH) exists on the BUSY line. When the computer wants to access the drive, it "pulls down" this signal to zero (LOW). When the computer is finished with the drive, it releases the signal and the drive "pulls up" the signal to its original five volts. If two drives are hooked up, only *one* of them may contain pull up circuitry because the computer can only pull down five volts.

Pull-up circuitry is usually contained in a chip in the drive. And now you are at the point where you *must* know enough about your 5 1/4-inch drive to figure out where that chip is.

Since the ST drive A contains all the pull-up termination circuitry we need, we must remove any termination packs from the remote drive. In the case of my Tandon TM-100-2 drive I also needed to deal with the select line termination, since it doesn't go through the resistor pack. I had to clip out resistor R14 from my Tandon to get rid of the added termination.

Special Note: The ST monitor throws out a great deal of magnetism. If you don't keep your drive at least one foot from the monitor, the disk's heads will pick up the monitor's signals and confuse the read data. You'll immediately notice data errors if you get your drive too close to the monitor. This is a good reason to use a fairly long ribbon cable (3 feet or so) (*We haven't noticed this problem on our in-house development machine. Perhaps 5 1/4-inch drives are more vulnerable to magnetism.* —ANTIC ED.)

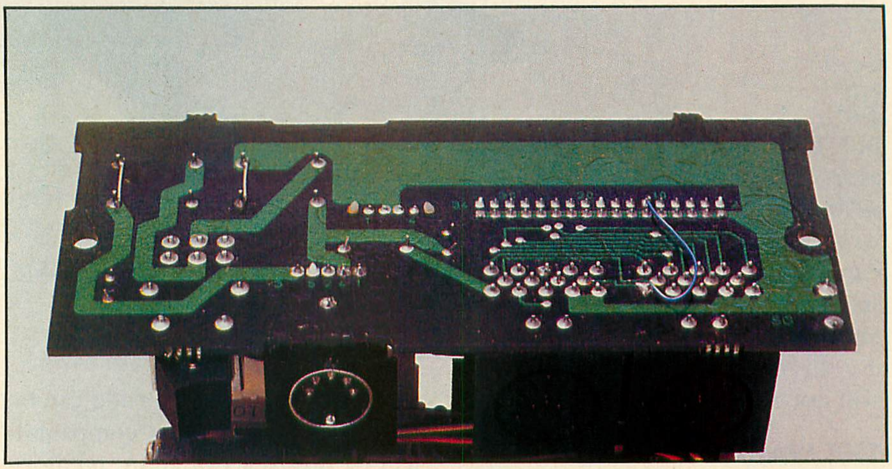


Figure 3: On the bottom of the 3 1/2-inch drive's connector board, a blue jumper wire is soldered from pin 6 of the DIN connector to pin 12 of the ribbon connector.

ALL DONE

All right, let's assume you have added an 80-track drive. Put the disk in, close the door and turn on the system. Click on drive B, select FORMAT, and format the disk either single-sided or double-sided.

From then on, treat the 80-track drive as an Atari ST drive. Note: 80 track drives have traditionally been persnickety, which is why 40-track drives remain popular. Keep a sharp eye on the drive's alignment. It takes very little misalignment to make a disk that only one 80-track drive in the whole world can read.

If you've added a 40-track drive, you may use it as an ST drive in only a limited fashion. You can't use FORMAT or a track copy, because they'll try to force the drive past its 40th track.

IBM ST

On the other hand, you can put an IBM PC disk in that 40-track drive, and click on the B icon. It'll pull up the disk's directory into folders and "text only" files.

You'll notice on the top of the window an PC-DOS type of "pathname" consisting of multiple (if needed) folders and a file name. GEM simply turns the concept of pathnames into folder icons and moves you through the path by your actions of selecting, opening, or closing a folder.

Of course, you can't run IBM programs because these are written in IBM assembly language, which the ST cannot understand. However, you can freely copy and use text files and the data within them. Furthermore, if you write from the ST to the PC disk, you'll find that an IBM has no trouble reading what you wrote.

It is a strange feeling for me to see that Atari has chosen IBM disk compatability. (On rumor claims this particular disk format is used by IBM's yet-to-be-seen PC II computer, which uses 3 1/2-inch disks). For so many years, the Atari system was utterly incompatible with anything else. Now the ST is PC data-compatible. Smart move. It is also very pleasant to be able to transfer data so quickly and easily.

*David Small, a professional programmer and longtime **Antic** contributor, is currently developing ST software for Batteries Included. He and his wife Sandy are co-authors of "Guidebook For Winning Adventurers," reviewed in the September, 1985 **Antic**.*

ST SOUND

Hearing the AY-3-8910 chip

by PATRICK BASS, **Antic** ST Program Editor

Atari 8-bit computers make music using a chip called POKEY, and control is limited to choosing pitch and volume. Fancy music can be played, but only at great cost in processing time. The Atari 520ST uses a newer sound chip, the AY-3–8910, made by General Instrument Corp. This chip has been used in many Apple II add-on music boards, and it has also been selected for all Japanese computers using the MSX standard.

The AY-3–8910 can play music through as many as three voices at the same time. Each voice has 4,096 different pitches and full control over the ADSR (Attack, Decay, Sustain, Release) envelope.

The chip produces sound by dividing an incoming Master clock frequency by 16, and then by the number stored in the voice's frequency register. Every time the number counts down to zero, that voice's sound output line is toggled, in effect creating an output square wave. A square wave creates a tone similar to a woodwind or reed instrument.

THE REGISTERS

The AY-3–8910 has 16 separate registers, numbered $00-$0F. Each register is eight bits wide, but some registers do not use all their assigned bits. These registers are shown in the diagram in *Figure 1.*

In the left column you can see the register number, the middle column shows the register function names, and the right-hand column maps the bit-assignment for each register, numbered from 7 to 0. The last two registers, $0E and $0F, are input/output ports and have no bearing on the operation of the AY-3–8910 in making sound.

Registers $00 through $05 control the frequency (pitch) of each voice. The six registers are paired off for each of the three voices. Bits 0–7 of the note are in the first register of each pair, and bits 8–11 can be found in bits 0–3 of the second register. The remaining four bits are not used. Thus, each of the three paired note registers form a 12-bit number whose value ranges from zero to 4095.

Given a master clock frequency of 2 megahertz divided by 16, or 125 Khz, and setting *no* bits for highest frequency, we get a highest note of 125Khz divided by zero, or 125,000 cycles per second. If we set *all* the bits in the frequency register, the lowest note is 125Khz divided by 4095, or roughly 30 cycles per second.

We can output either pure tones or "noise." The random noise is also produced through a square wave. The period (width) of this square-shaped pulse of sound affects its tone, and is controlled by register $06. Five bits of resolution offer a range of 0–31. In effect, this control acts just like the treble/bass tone control on your stereo. Low numbers stored in this register will "brighten" the noise and high numbers will "mute" the noise.

Register $07 has multiple functions. Looking at the register from the right, bits 0–2 control if voices A, B and C play pure tones. These are needed for music. The bar above TONE means, "This function is active when the bit is a zero, or LO." No bar shows that a one, or HI, is needed. Bits 3–5 control if noise is played through A, B or C. This would be used for explosions, jet planes, etc.

Bits 6 and 7 have nothing to do with sound. They control if the two I/O ports located in registers $0E and $0F are input or output ports. Since register $07 controls your floppy I/O, be sure and save its state before you alter it, or you will surely lose contact with your disk drives.

Registers $08, $09, and $0A have split functions. First, bits 0–3 control the volume of the voice chosen. Four bits of resolution give us a range of 0–15. Zero is off, and 15 is loudest. However, if bit 4, the "M" bit in the diagram, is set to a 1 then the lower four bits are ignored, and volume information is taken from Registers $0B, $0C and $0D, which enables effects such as wah-wah and vibrato.

ADSR ENVELOPE

Registers $0B and $0C control how long each stage of the ADSR envelope lasts. These two full registers give 16 bits of resolution, or a range of 0–65535. The incoming master clock frequency here is first divided by 256, then this result is divided by the 16-bit number in registers $0B and $0C.

The result is how long each stage of your desired ADSR envelope lasts. "Attack" is how quickly the sound rises from

silence to its greatest volume."Decay" is the time required for the sound level to fall to a constant level, called the "Sustain," where it continues to play until falling off to silence, or "Release."

Register $0D allows the programmer to select which section of the ADSR envelope is operating. The upper four bits are unused, but the lower four bits are set to select one of 10 available waveforms. (See *Figure 2*.) For example, at the bottom of the chart, when all four bits are set, the resulting waveform will start at silence, rise to its greatest volume, then end suddenly and stay silent. The waveform above that (bit pattern 1110) causes the volume of the sound to rise and fall in a repeating pattern.

As previously mentioned, registers $0E and $0F are I/O Ports A and B and have nothing to do with sound output. They connect to RS232, floppy, DMA, and parallel ports.

SOUND DEMO

This month's Sound Demonstration program demonstrates how to read and write values to the AY-3-8910. The program is written in the C language. Last month's issue of **Antic** introduced the fundamentals of C programming for the Atari ST computers.

The ST Sound program tracks the mouse as it is moved around the desktop, and the mouse's X and Y position values are used as notes for Voices A and B respectively. Current results are then printed to the screen with special GEM VDI graphics text calls. The [LEFT-SHIFT] key raises the volume, and the [ALTERNATE] key lowers it. Pressing the left mouse button will exit the program.

PROGRAM TAKE-APART

Since this program is quite similar to the GEM Color Cascade program presented last month, we can skim over the declaration and opening of a workstation. At the top we see a block of **#include** files, which have pre-written definitions in them. Next, a long line of **int**'s, which here act just like initializing a variable in BASIC. Since **int**'s are 16-bit values and the AY-3-8910 registers are eight bits wide we define our notes, **note_lo** and **note_hi**, as **char**'s, or 8-bit values.

We have one function defined in this program, **main( )**. The instructions that follow down through **yres = l_out[1]**; say, "Initialize the application (program), get the 'handle,' or ID number, of this window, initialize an input array called **l_intin**, open a workstation, and get the width and height of this window (**xres, yres**)." The **graf_mouse( )** (graphics mouse) call changes the

continued on next page

Figure 1

AY-3-8910 REGISTERS

REGISTER		B7	B6	B5	B4	B3	B2	B1	B0
$00	CHANNEL A FREQUENCY	8 BIT FINE TUNE A							
$01						COARSE TUNE A			
$02	CHANNEL B FREQUENCY	8 BIT FINE TUNE B							
$03						COARSE TUNE B			
$04	CHANNEL C FREQUENCY	8 BIT FINE TUNE C							
$05						COARSE TUNE C			
$06	NOISE PERIOD				5 BIT PERIOD CONTROL				
$07	VOICE ENABLE	IN/OUT		NOISE			TONE		
		IOB	IOA	C	B	A	C	B	A
$08	CHANNEL A VOLUME				M	L3	L2	L1	L0
$09	CHANNEL B VOLUME				M	L3	L2	L1	L0
$0A	CHANNEL C VOLUME				M	L3	L2	L1	L0
$0B	ENVELOPE PERIOD	8 BIT FINE TUNE E							
$0C		8 BIT COARSE TUNE E							
$0D	ENVELOPE SHAPE/CYCLE					CONTINUE	ATTACK	ALTERNATE	HOLD
$0E	I/O PORT A	8 BIT PARALLEL PORT A							
$0F	I/O PORT B	8 BIT PARALLEL PORT B							

mouse form into a pointing finger, which is one of seven pre-defined mouse forms stored inside the computer.

Next come new text functions. The function **vst_effects( )** (VDI-Set Text Effects) determines how the letters will be displayed. Choices such as normal, thickened, skewed (italics) and outlined are available. Notice we have defined four types in our variable declarations. The first **vst_effects( )** call says, "In window 'handle,' use skewed characters."

Right after that call, on the same line, is a **vst_color( )** call (VDI-Set Text Color) which selects the color the text will be printed in. The call **vst_color(handle, BLUE)** says, "In window 'handle,' draw the needed text in color 'BLUE'." BLUE represents a value previously defined in the **#include**d file **"obdefs.h"**.

On the next line is the GEM call to print a text string to the screen: **v_gtext( )** (VDI Graphic Text). The call requires that we tell it which window number to write to, the X,Y co-ordinates where the text will start, and the string itself or its address. So, combining the two lines of instructions above, we wind up printing skewed blue text to cursor position 10, 20.

The next four pairs of lines print the rest of our text in various shapes and colors. We now come to the first call we make to the AY-3–8910 itself.

SOUND CHIP CALL

The GEM call **Giaccess( )** (General Instruments Access) takes the form: result = **Giaccess (value, register)**. To write to a register, add 128 to the register number, otherwise the register will be read and a number returned.

When writing, the amount to write is supplied by our program in **value** and when reading, the registers' value is returned in **result**. These first two calls access registers $08 and $09, setting voices A and B at an initial volume of eight, or about halfway. Press the [LEFT-SHIFT] key to raise the volume, and press the [ALTERNATE] key to lower the volume. Press the left mouse button to exit.

On the next line we save the number in the port control register in **port_state**, so later when we exit we don't lose touch with the disks. The next line is a **Giaccess( )** call that accesses register $07 and turns on voices A and B so they use pure tones. We use the decimal number 60 here because 60 is the decimal value of the binary bit pattern (00 111 100) used to activate voices A and B.

For bits 0, 1 and 2, bit 2 is voice C. We do not use it, so we set that bit to a one. Bits 1 and 0 are voices B and A, respectively. They are active so we place a zero in their bits. We do not want random noise (bits 3, 4 and 5) in any voice so we set each voice bit to a one. Remember, a bar above means the function is active when LO. The upper two bits, 6 and 7, which control the direction of each I/O port, are not used in our program and are thus relegated to zero.

Next we enter a DO. . .WHILE loop. In effect, we DO make noise WHILE not told to stop by pressing the left mouse button. The first GEM call and a block of four IF statements questions the keyboard and determines if the [LEFT-SHIFT] or [ALTERNATE] keys are pressed. If so, it adjusts the volume.

The next two **Giaccess( )** calls update the current volume. Now we call **vq_mouse( )** (VDI Question Mouse) which answers whether the mouse button was pressed and locates where the mouse is.

X,Y VOICES

The next line sets **x_note** to a value proportional to both the mouse X-coordinate on the screen, and to the range of values the frequency counter can take. We take this value in **x_note** and bitwise break it into an 8-bit LO byte and a 4-bit HI nibble which are put in **note_lo** and **note_hi**. Then we call **Giaccess( )** to turn on voice A with the results.

The next block of code does the same for voice B and the Y-coordinate.

The following three blocks of lines print to the screen the values we are using for the frequencies and volume. The variable **number1** is a floating-point variable. It is needed for the line below, which converts a floating-point number to an ASCII string. The call **ftoa( )** (float-to-ASCII) reads: "**ftoa(** number to print, buffer to build number in, number of digits to right of decimal point)." The GEM calls **vst_effects( )**, **vst_color( )** and **v_gtext( )** then set the text style and color, and print out the number.

The line that ends the loop tests the value we picked up in the **vq_mouse( )** call. If **m_state** is any value greater than zero, the button has been pressed.

To clean up, we make two **Giaccess( )** calls. One shuts off the voices by turning the volume all the way down. The second restores the I/O Ports to the way we found them when we walked in. We then perform a standard GEM exit.

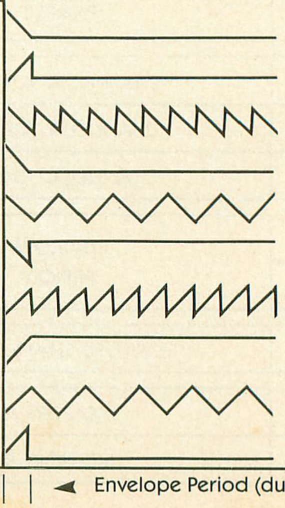
Figure 2

REGISTER $0D WAVEFORM CONTROL

0—Off
1—On
X—Not Used

Control Bits B3 CONTINUE	B2 ATTACK	B1 ALTERNATE	B0 HOLD
0	0	X	X
0	1	X	X
1	0	0	0
1	0	0	1
1	0	1	0
1	0	1	1
1	1	0	0
1	1	0	1
1	1	1	0
1	1	1	1

Selected Waveform Shape

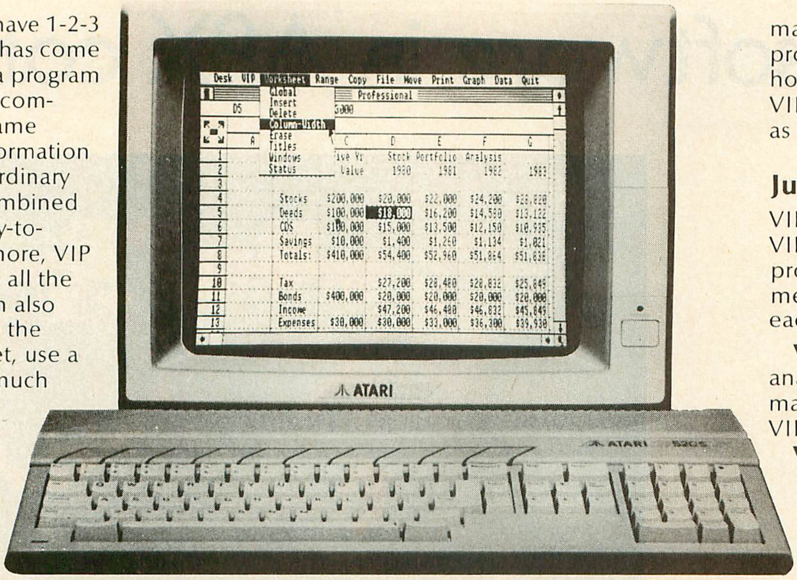


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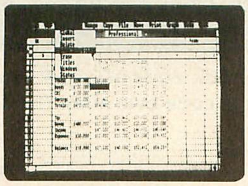
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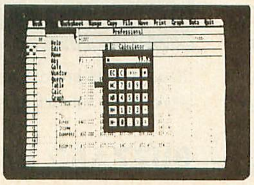


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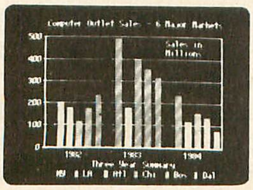
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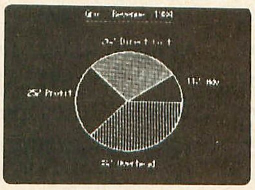
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123 Graphics	Yes	Yes
123 Database	Yes	Yes
123 Macros	Yes	Yes
123 Files	Yes	Yes
Enhanced Graphs	Yes	No
Uses mouse	Yes	No
Drop-Down Menus	Yes	No
Icons	Yes	No
GEM interface	Yes	No
Multiple windows	Yes	No
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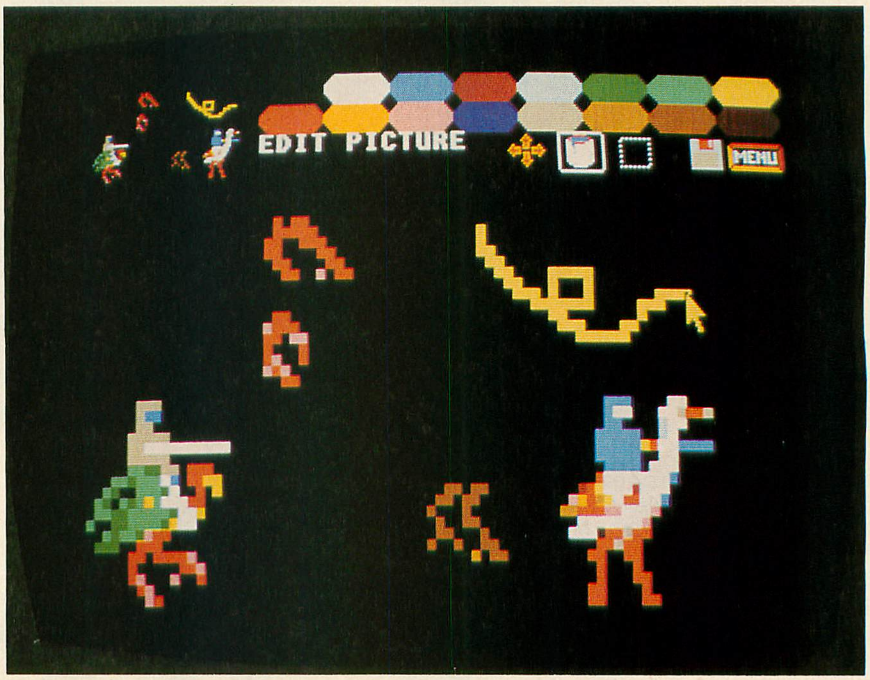
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C.O.L.R. OBJECT EDITOR

First ST software in APX catalog

by GIGI BISSON



Joust birds are created in Edit Mode of C.O.L.R. Object Editor. Images may be moved to Mural Screen or saved as source code byte array. The actual-size image appears in the upper left

It's as if you buy a state-of-the-art Ferrari, but you need to re-invent the wheel before you can drive.

And then you need to re-invent the tire.

And then you need to teach yourself how to drive all over again . . .

When you're programming for a machine as raw and unexplored as the Atari 520ST, you can't just plug it in and go—you must start from scratch.

It's a challenge that The Rugby Circle eagerly accepted. Rugby Circle of Bloomfield Hills, Michigan is the software development partnership of Robert Lech, 23 and Troy Dahlman, 19. When they began to adapt a classic arcade videogame to the Atari ST computer, they didn't just have to re-invent the wheel. They had to re-invent the tool kit—in this case, the **C.O.L.R. Object Editor.**

BUZZARD BAIT

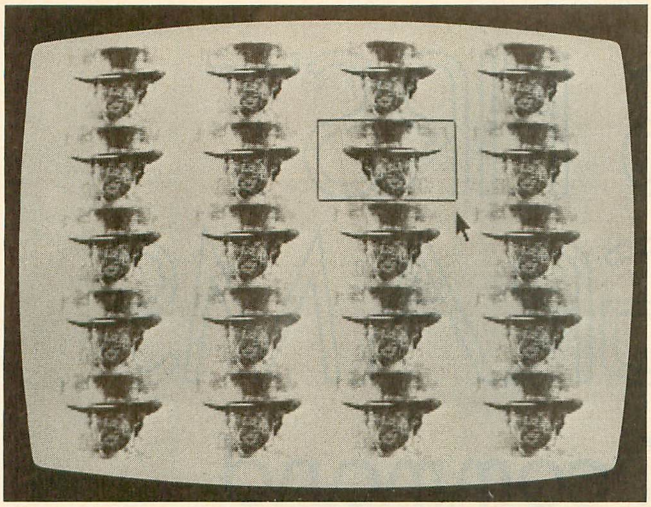
The Rugby Circle company is named for the street where both partners used to live. Dahlman and Lech wanted to be "first on the block" to own an ST. After diligent letter-writing, they persuaded Atari to include them among the first 20 software developers allowed the privilege of buying a pre-production ST for $4,500.

"We figured we were buying time," Troy says. Little did they know how badly they would need that early start.

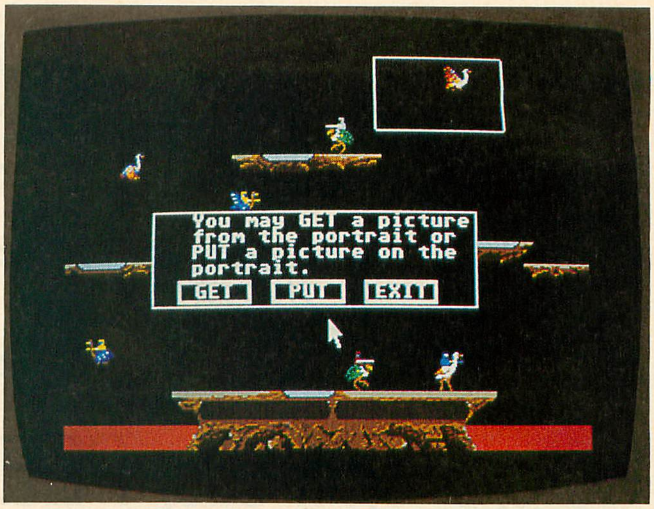
They plugged in their ST. It blinked to life. Somewhere, deep inside the machine were all sorts of treasures—a palette of 512 colors, little birds, symphonies . . . best-selling software waiting to be written. The ST blinked again.

"We took it apart and everything," Bob says. "It looks awfully nice." But they had no software, no graphics tools. Nothing. Their sleek gray plastic desk-top Ferrari was all gassed up with no place to go.

The partners now had a $6,000 hardware investment to recoup. (They bought a second pre-production ST after Atari lowered the price.) They decided to write a game that would showcase the ST's 16 onscreen colors



Clint's steely gaze is multiplied in Mural Mode. Note the flipped window.



Preliminary Joust screen with birds was created in Edit Mode, then moved panel-by-panel, to Mural Screen.

and high-resolution graphics.

For their first ST project, they chose **Joust**. They had previously adapted it to the Radio Shack Color Computer as "Buzzard Bait." (Joust, the last game generated during Atari's late, great arcade game boom, greeted players with "Prepare to joust, buzzard bait!")

It was hardly a bird-brained idea. After all, these guys are professionals who have been in the business for five years now. (Troy started when he was 14 years old.) They wrote "Mastering the SAT" for CBS Software and other lucrative educational programs for Radio Shack.

ARCADE R&D

Source code for Joust was nonexistent, and it took a nationwide telephone search to track down one of the original Joust bird artists. She offered hints on how the graphics were designed—for a price.

Finally, they decided their only resource was the Joust arcade game itself. They entered the exploding, dinging madness of a video arcade. Carrying a camera and a cumbersome screen-shot attachment, they tried to take action photos of dueling knights mounted on ostrich-like birds. But that wasn't the hard part.

"We had enough trouble just trying to find an arcade that still had Joust," Troy recalls with a laugh. Fortunately, they found a surviving game shrouded in an inconspicuous arcade corner. One partner dropped quarters while the other took pictures. Perhaps they looked like shameless video addicts desperate for clues to master the game.

Meanwhile, back on Rugby Circle, Bob had to teach himself the C programming language. Then the partners were faced with the eternal question: "Which came first, the buzzard or the egg?" Troy wanted to create tiny jousters on a computer that was capable of fine graphic resolution, but had no existing graphics tools. So he needed a sprite editor to create a bouncing bird on a machine that doesn't have sprites . . .

SURPRISE SUCCESS

In the dark ages of computing, before programmers could even start writing programs they had to write development software—a text editor—just to write the program with. This programming tool eventually became the commercial word processors of today.

The Rugby Circle C.O.L.R. Object Editor is the same sort of first-generation product. It's a programming utility, invented by programmers who needed an in-house game development tool.

Rugby Circle decided to send their screens of birds and landscapes to Antic ST Research & Development, just to show us what they were doing.

Nice birds, we said. But we began drooling over the graphics editor. We knew that ST users would need a graphics utility tool right away and here it was. **Antic** immediately contacted Bob and Troy, and C.O.L.R. became the very first ST product in the Antic Arcade Catalog.

"We never dreamed the graphics editor could be a commercial product at all," Troy says. The game wasn't even finished, and they already had a product—the first commercially available programmers' tool for the ST.

PSEUDO SPRITES

Instead of traditional sprites, the ST uses a specialized command known as a bit block transfer (BitBlt, or Blting). The C.O.L.R. editor generates source code that helps design these bit blocks or "software sprites"—the closest thing to Player/Missiles that the ST has. Yet, with the ST's incredible 68000 microprocessor speed, Player/Missiles are unecessary. ST developers have reported up to 80 sprites zipping around the screen simultaneously.

The C.O.L.R. editor is a no-nonsense, cursor-based sketching program that uses the GEM interface to automate a cumbersome process. It generates bit-mapped pictures and converts them to disk data files in usable byte-array format.

No cute little paint buckets and pencils here. A palette is set with 16 of the ST's 512 possible colors. The colors are picked up with the mouse and transferred to the image. Four additional 16-color palettes can be set

continued on page 24

READER'S FIRST ST PROGRAMS

Logo spirals, PEEK command

by FRED HATFIELD

When I sat down to read the Wednesday paper, I spotted the long-awaited ad—**Atari 520ST In Stock!** There it was. I'd spent the previous six months tracking the fortunes of Atari distribution through PR announcements in industry publications and occasional mentions in the staid Wall Street Journal. Jack Tramiel had supposedly sent 520ST's to Europe and Canada, but it was hard to believe that I would finally see the fabled "Jackintosh" in reality.

I lost little time getting on the expressway and driving to a suburban computer store that I'd never been to before. A young salesman greeted me as I entered and ushered me to a table where the 520ST was resting comfortably with a (gasp) dark video screen.

"Where's the display?" I asked anxiously.

"Bad news," was the reply. "The power supply was damaged in shipping, so we can't demonstrate it."

Disappointedly, I glanced through the technical manual. The intriguing illustrations of high-resolution displays only whetted my appetite some more.

"When will the power supply be replaced?" I demanded. "How soon can I see it in operation?"

"The rep is on the way, but he has a couple of other stops to make first," said the salesman. "And I'm not sure if he'll have a replacement power supply with him."

I could see that I would only frustrate myself further by hanging around. So I left my card and made the salesman swear to phone me as soon as the ST demonsrator was operational.

But I phoned the store the next day, too impatient to wait. The salesman assured me they would have the demonstrator running within a few days. Swell.

I was idly scanning the classifieds when another advertisement jumped out at me—**We Have The 520ST**. This computer store was completely on the opposite side of town and I had enough sense to call first before jumping into my car.

Yes, they had a number of 520STs in stock and a working demonstrator. After an excited drive, there it was—sitting on a desk with a *color* display.

The young lady on duty had not been briefed on how to operate the machine. But she didn't object to letting me sit down at the keyboard and start fooling around.

As I groped with the mouse, another customer and his son showed up to watch. From their comments and suggestions, I realized they had somehow gotten a pretty good idea how to operate the GEM graphic desktop.

So I gave up my seat and asked where they got their advance information. It turned out they'd read step-by-step instructions on how to navigate the desktop in the August, 1985 issue of a magazine called **Antic**.

Careful questioning of the saleslady revealed that she had that particular issue on hand. I immediately acquired that valuable publication. And while I was at it, I figured I might as well go for another $1,000 and I bought a 520ST color system on the spot.

They threw in a box of 3 1/2-inch disks. I rushed home with my purchases, unpacked everything, connected all the cables and powered up. A gorgeous display of Atari fuji symbols and all the colors of the rainbow flashed across the screen.

Soon a bell rang, telling me to move the mouse and place the screen cursor on an OK box. I responded and saw the select light illuminate on the disk drive. The disk was being accessed for information. I could hear the head stepping from track to track and the cursor changed to a . . . bumblebee!

Sudddenly I was faced with a strange display on the screen. HORRORS! These were not the neat icons and colors I'd seen at the computer store. I repeated the operation in different sequences, but the results were always the same.

I had to drag myself away for a business appointment. When I got home, I tried again. No better luck. It was now after five, but I dubiously tried phoning the store anyway. . .

continued on page 24

FIRST ST PROGRAM
continued from page 22

The owner was there. I explained the stopping point and he said, "Come right out, we'll replace it immediately." He remained open to allow me time to drive across town again. When I arrived, he replaced the system, hooked up my new 520ST and exercised it thoroughly.

As a bonus, the September issue of **Antic** had just arrived with more great information about the ST. That alone would have been worth driving across town for.

Once again I rushed home with all my new loot. Excitedly I connected the cables and carefully turned on the machine. It worked! It was beautiful! Hooray!

WHAT I LEARNED

Despite some predictable minor faults, the user manual is excellent. This is so important for an anxiously awaited machine like the ST. I still remember the first Trash-80s coming with a skimpy two or three pages of documentation until the operating manual arrived by mail.

I had expected that with a single disk drive, making backup disks might follow the much-criticized Macintosh pattern of excessive disk changes. I was pleasantly surprised to find that the display dynamically indicates loading sectors into memory and writing sectors to the new disk. Only two disk swaps! I loved it!

My system came with TOS and Logo disks. BASIC was promised for later. I had trouble getting a program to execute by double-clicking the mouse. This impasse was overcome when I discovered I actually needed to click the File drop-down menu twice—once to open the disk directory and once to open the selected file.

You quickly run up against the limits of the supplied software—an operating system with nothing to operate on and a Logo "sourcebook" that's not enough to get a beginner started programming in this language. However, with some probing and the primitive examples in the booklet, I managed to come up with some minor programs that allowed me to see how the Control Panel and Graphics settings actually work.

As I became more familiar with the drop-down menus and how they affected the display, I became more adventurous. After all, that's what's exciting about computers, isn't it?

SAMPLE PROGRAMS

The following Logo program draws a spiral pattern in the display area. Try changing the graphics settings for various background colors and line textures.

```
TO SPIRAL :ANGLE :LENGTH
IF ( :LENGTH > 100 ) [STOP]
[FORWARD :LENGTH]
RIGHT :ANGLE
SPIRAL :ANGLE :LENGTH + 3
END
```

The system will follow your END entry with: SPIRAL defined

To execute, enter at the ?: SPIRAL123 3

You should get an interesting spiral pattern in the graphics area. Due to the limited stack size, you will get a dialogue block indicating that you have overrun the stack. But pressing the [RETURN] key displays the pattern.

ST PEEK

I always like to be able see what's in memory locations of a computer. I thought there must be a way to get the equivalent of a PEEK function. There is a way—the primitive .EXAMINE will do it, although the display is limited to memory locations between $800 and $77FFF. Try the following:

```
TO DUMP :START :STOP
IF ( :START > = :STOP ) [STOP]
[MAKE "START :START + 1]
TYPE .EXAMINE :START TYPE [-]
DUMP :START :STOP
END
```

To use, enter DUMP followed by a start address and end the address as shown below: DUMP 491000 491010

That's it for now. I just hope you're having as much fun with your ST as I am with mine.

Fred Hatfield is a computer systems consultant from New Orleans and his ham radio station is K8VDU. This article arrived arrived at ***Antic*** *less than a week after the September issue started appearing on newsstands.*

OBJECT EDITOR
continued from page 20

in memory and called up by pressing a function key.

C.O.L.R. gives you a full-screen 320 x 200 picture space. You can grab any 80 x 40 chunk of the image with the editing drag box and blow it up in "fat bits" on an Edit Screen that fills 90% of the display. Now the fat bits are easily manipulated with the mouse—or with the cursor keys for even finer detail.

Simultaneously, a postage-stamp sized window of the actual bit-mapped sprite is always displayed in the upper left corner of the screen. X,Y coordinates are also constantly on display, helping you keep track of objects as you invert, twist, or copy them.

C.O.L.R. provides a storage buffer for 20 Edit Screens. The C.O.L.R. byte arrays can later be manipulated from assembly language, Forth and BASIC as well as C.

This program produces graphic images so detailed that you have to squint to see the dots. The resolution is as good as a digitized photograph—certainly on par with a coin-operated arcade game.

NIGHTMARE PRAISE

Rugby Circle's words of praise for the ST might give nightmares to Atari executives who are working hard to shake off Atari's "just a you-know-what machine" image.

"I always wanted a computer that could match the quality of arcade graphics and sound, and had a Motorola 68000 chip," says Troy, who until now programmed on the Radio Shack Color Computer. The ST is his dream machine in living color.

"It's not work—it's fun coming home to an ST every night," says Bob, who doesn't get to bring flapping birds to life during his day job as a systems programmer at Birmingham Data Systems.

"A lot of people look down their noses at game programmers," he says. "Well, games are just as difficult to write."

Enough already, we believe you.

software

TYPO II DOUBLE FEATURE

*A double feature! Two updated enhancements of the TYPO II program typing checker, combining the best ideas contributed by **Antic** readers. Both BASIC programs will run on all Atari 8-bit computers of any memory size, with disk or cassette. **Antic** still recommends that newcomers to TYPO II start by typing in and using the simpler original program in this issue's Software Library.*

I: Super duper TYPO II 'per

by JACK POWELL

If you are new to **Antic**, TYPO II is a program that finds the exact lines where you made mistakes while typing in BASIC listings from the magazine. You'll see it in each issue, along with instructions, on the third page of the monthly Software Library section.

When **Antic** was preparing to premiere TYPO II in the January, 1985 issue, we spent a great deal of time making the program as simple as possible for beginners. Evidently we succeeded, because **Antic** now gets a lot less letters from readers having trouble typing in the printed programs.

At the same time, **Antic** has encouraged advanced programmers to customize TYPO II for their own needs.

Turbo TYPO II (June, 1985) made the program a lot speedier with David McLaughlin's machine language string. In the May, 1985 I/O Board, Patrick Dell'Era added the convenience of automatic line numbering and inverse video TYPO II codes for easier reading. In the April, 1985 I/O Board, Ted Solomon added a subroutine that makes TYPO II delete itself.

And now, we've put the whole shebang together into one customized listing called Super Duper TYPO II 'Per (S.D.T.2.P.)

HOW IT WORKS

There are some special Atari characters in S.D.T.2.P., so type it in carefully and be sure you SAVE a copy before you RUN it. You can't check it with TYPO II. But you can check it with itself—after you type it in. Again, if this is your first time with TYPO II, we recommend you get some practice with the shorter, easier version in this issue's Software Library.

Except for being faster, S.D.T.2.P. works pretty much the same as the original TYPO II. Just type GOTO 32000, then answer the prompt by typing in a program line and pressing [RETURN]. The line will reappear at the bottom of the screen with the two-letter TYPO II code—in inverse video—at the left of the line number.

As with TYPO II, you may press [RETURN] to bring the line back into the editing area, and you may bring up any line by typing an asterisk [*] followed by the line number. But unlike TYPO II, you can also automatically step through the lines you've typed in.

Let's say you want to check S.D.T.2.P. itself. At the prompt, type *32000 to bring line 32000 into the edit area. Press [RETURN] to generate the code for that line. And now, press the plus key [+] followed by [RETURN]. The next program line will automatically appear in the edit window, disappear, then reappear below with its code. Continue to press [+] to go through the entire listing.

ERASER HEAD

You've finished typing in your program, and you want to SAVE it without S.D.T.2.P. Just type ERASE and S.D.T.2.P. will erase itself from memory, leaving only the program you typed in. Alternatively, if you've already pressed [BREAK], you can type GOTO 32250 and accomplish the same thing.

Listing on page 58

II: TYPO II code generator

by ANDY BARTON

It's nice to have the line-by-line checkup codes of TYPO II. But it's not always so nice when you need to look up at the screen after each line and check the code.

Especially when you're a fairly experienced programmer, there's a temptation to assume you got the easy lines right and to continue typing ahead without glancing up. Or perhaps your late-night blurry vision may misread an incorrect code. And then when the program crashes, you're stuck with TYPO II's tedious "*line no." option to recheck all the codes.

So for those who like the old way better, here is TYPO II Code Generator. It works much like the original TYPO program. It calculates and prints out all the TYPO II codes and matching line numbers for any program you have LISTed to disk or cassette.

USING THE PROGRAM

Type in TYPO II Code Generator, check it with TYPO II (or S.D.T.2.P.) and SAVE it on disk or cassette. Note: B$ in line 55 is the same as B$ in S.D.T.2.P.

When you RUN the program, it will prompt you to "Choose a file [D:filename]." Type in the device (D:) and filename of a LISTed BASIC program (cassette users, type C:). Then press [RETURN].

Newcomers: a LISTed program is created by using the BASIC command LIST instead of SAVE when storing a program on disk or cassette. The form is: LIST "D:FILENAME" (or LIST "C:").

The filename you give TYPO II Code Generator can be a complete BASIC program or just a portion of one. You may wish to check just a few lines. No problem.

If you're not sure of the file's name, or if you typed an incorrect name, disk owners will be presented with a file directory after pressing [RETURN].

OUTPUT CHOICE

TYPO II Code Generator will now give you a choice of four output devices: **S**creen, **P**rinter, **D**isk, or **C**assette.

If you choose [S], the codes and line numbers will scroll across your screen. Press [CONTROL] [1] to stop the scroll and [CONTROL] [1] again to continue.

Choose [P] to send the codes directly to your printer.

The [D] choice will write the codes to a disk file much as they look on the screen. You will be prompted for a device and filename. If you don't give your file an extender, TYPO II CODE GENERATOR will supply it with .TYP.

If you select [C] to send your codes to a cassette tape, be sure your machine is set to RECORD.

Listing on page 58

software

130XE MEMORY MANAGEMENT

How to use the XE's extra 64K

IAN CHADWICK

*A complete explanation of the extended 64K RAM in the Atari 130XE, by Ian Chadwick, author of **Mapping The Atari**. Includes a tutorial program showing how to access the extra memory from BASIC. Requires a 130XE computer and intermediate programming knowledge.*

If we were stranded on a desert island with nothing but our (solar-powered?) Atari and only one book, we'd have no hesitation in choosing Ian Chadwick's Mapping The Atari. *During any programming session at **Antic**, this comprehensive sourcebook is never more than an arms' length away. Our copy of the familiar white, spiral-bound book is dog-eared and smudged. We were about to order another when Ian told us he just finished revising his classic to include the XL and XE memory locations. At our request, he generously provided this thorough description of the 130XE extended RAM—and how to get at it.*—ANTIC ED

Atari has released a computer with 128K RAM, but it may not be exactly what you expected. True, it has 128K RAM available. But's it's not entirely available as one large block. Instead, it's switched in and out in 16K blocks by setting and resetting bits in PORTB (54017—$D301).

Machine language programmers will have no difficulty in bank selecting the extended area fast enough to make it seem that a larger selection of RAM is available—Atari's own DOS 2.5 RAMdisk program does this. BASIC programmers will have to be content with shunting about in 16K blocks.

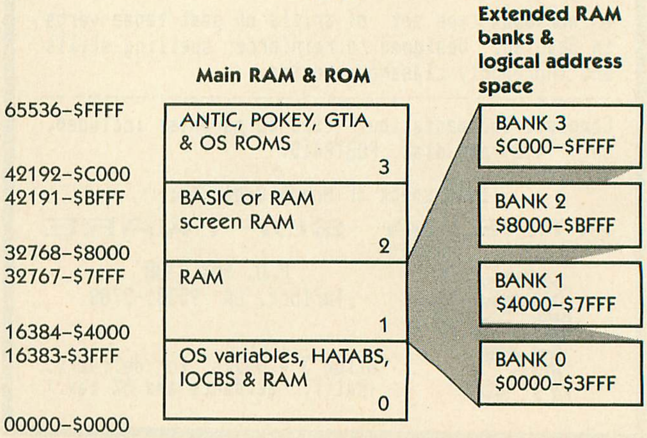
MEMORY MANAGEMENT

Briefly, you can tell either the CPU or the ANTIC chip that a block is available for that chip's use. The CPU can use it for data and variable storage, altered character sets, P/M graphic assemblies, machine language routines and the like. ANTIC uses the banks for graphic screens and display lists. Most BASIC commands—like PRINT and LIST—work in the main bank area and don't write to the extended bank unless you tell the CPU to use an extended bank at the same time ANTIC is using it. (See *Figure 1*.)

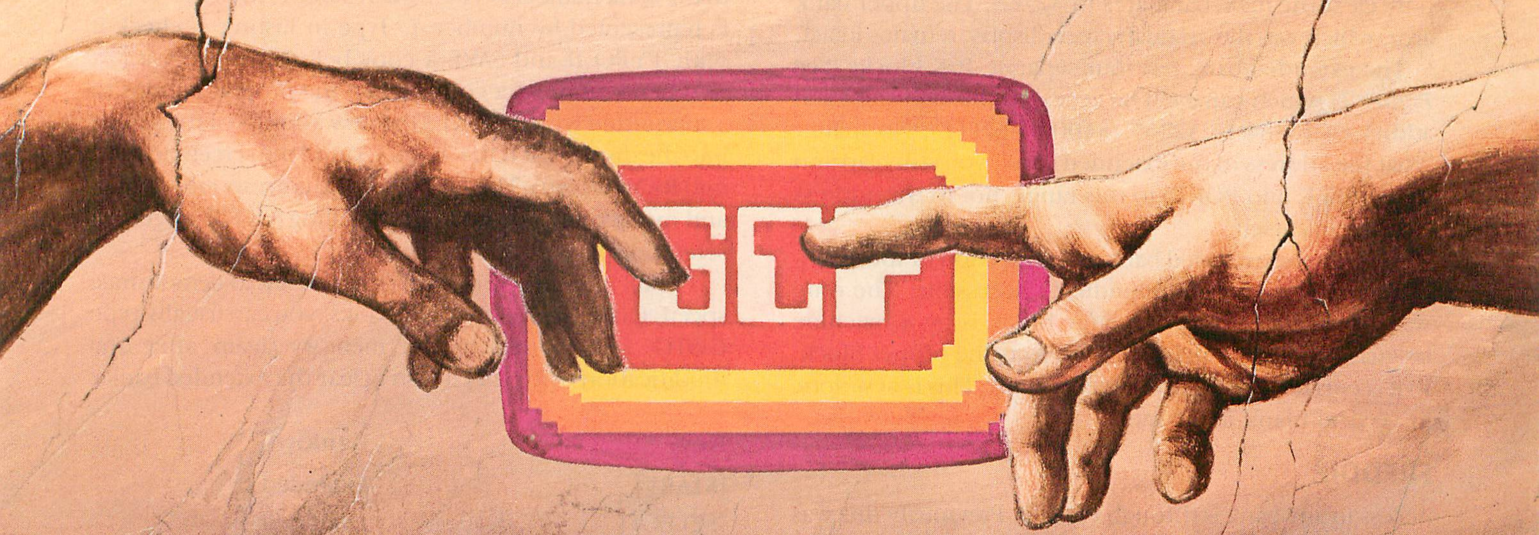
On the other hand, BASIC's clear screen command used in the extended bank will crash the program quite effectively. It disables the screen and keyboard, making it necessary to press [RESET] to recover.

continued on page 30

Figure 1

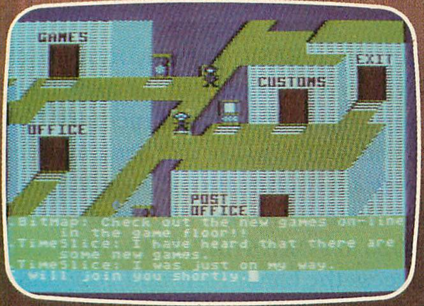


THE CREATION OF A NEW BREED

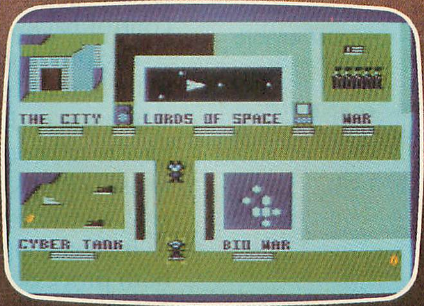


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continued from page 28

This happens because the command clears screen memory to RAMTOP, but gets confused by the bank switching. It clears the extended bank area and then the main bank which follows, erasing the display list and screen in higher RAM as well.

To avoid this, move RAMTOP (location 106) down (for example; POKE 106, 128) while ANTIC accesses the extended bank area, then POKE it back up for the original main bank display. Now if you [BREAK] your program while an extended bank is displayed, [SHIFT] [CLEAR] will only clear the main bank area to 32768. The upper bank area, which was the original screen display, remains intact.

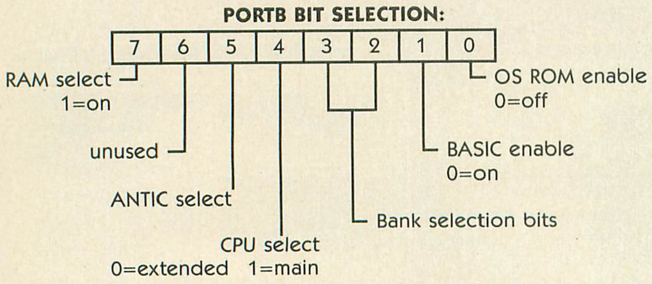
The extended bank has four separate 16K blocks (See *Figure 1*) which can each be accessed through the main addresses 16384 to 32767 ($4000—$7FFF). No matter what the address of the extended bank, you still read and write (PEEK and POKE) to this range, not to the address of the bank itself.

Imagine the extended bank as a collection of four identical ranges, each one individually accessible. The only way to use all four as one large block is by a machine language routine which rapidly selects the proper block, so it seems to be using one larger section. This is best done in vertical blank interrupts.

FREDDIE

Access to any bank is through PORTB. Previously this was the controller for the two additional joystick ports on the Atari 400/800 computers. Now it is the memory manager on the XL and XE models. Bits 2 and 3 select the bank to be accessed, bits 4 and 5 select the processor. (See *Figure 2*.) Both processors can access the same area at the same time if you set the bits correctly. The memory management chip is called "Freddie."

Figure 2



The key to access is POKEing PORTB with 129, plus the mode times 16, plus the bank times 4. (See *Figure 3*.) 129 turns off the self-test ROM, and turns on BASIC and ROM. 253 ($FD) is the default value. Machine language programmers obviously don't need BASIC, so add 131 ($83) to the formula instead of 129. The sixth bit isn't used in the 130XE, but it may be used in future Ataris. So you can also use 193 or 195 instead of 129, with the same results.

Figure 3

PORTB MEMORY ASSIGNMENT

BIT: 4	BIT: 5	6502 uses	ANTIC uses	MODE No.
0	0	Extd	Extd	0
0	1	Main	Extd	1
1	0	Extd	Main	2
1	1	Main	Main	3

PORTB BANK ASSIGNMENT

BIT: 2	BIT: 3	ADDRESS:	BANK No.
0	0	$0000–$3FFF	0
0	1	$4000–$7FFF	1
1	0	$8000–$BFFF	2
1	1	$C000–$FFFF	3

POKE 54017,129+(MODE*16)+(BANK*4)

PROGRAM EXAMPLE

Listing 1 demonstrates the extra memory by filling a portion of each extended bank with a value corresponding to the bank number—0 to 3. Main bank 1 (16384 to 32767) is represented by number 4. Type in Listing 1, check it with TYPO II and SAVE a copy before you RUN it.

When you press a console key, the program jumps to a subroutine which POKES the new address of the screen into the display list (DL + 4, DL + 5) and the screen pointers into RAM (88, 89). Then it POKEs the corresponding bank and mode number into PORTB, telling ANTIC to get the screen display from that bank.

The fill routine is slow, but it's not meant to demonstrate speed. Once you've filled the banks, you can usually type GOTO 140 to display the memory again after any modifications. [RESET] doesn't clear the extended banks.

Key:	Bank:
[START]	Extended 0
[SELECT]	Extended 1
[OPTION]	Extended 2
[START] [SELECT]	Extended 3
[START] [OPTION]	Main 1
[START] [SELECT] [OPTION]	Main 2 (Original screen)

The last key selection returns you to the original screen and display list seen when you boot BASIC.

If you press [BREAK] while any of the extended banks are displayed, the system appears to hang. It's not really locked up. Carefully type POKE 54017,253 and you'll get control back.

The problem comes when BASIC passes control back to the screen editor, which is processing in the main bank while you're displaying a block of extended memory. You have to tell both CPU and ANTIC to use that bank in order to use [BREAK] properly. Of course, [BREAK] works properly when any of the main banks are displayed.

Try changing line 1020 to POKE 54017, 193—this selects both processors to access the bank. Now add 1025 LIST 100,200 and type GOTO 160. The zero in an extended bank can use BASIC screen and graphic commands. If you press [BREAK] when this screen is displayed, it displays properly.

CAUTION!

There are several precautions to take!

First, fill all of the banks *before* you fill the main sec-

tion or use it for programming or data. If you are using the CPU (POKEs) to fill the banks while the display routine routes ANTIC to the extended area for the display, you could end up over-writing your own program space.

Try to avoid large strings as well. It's best to load the extended banks with a simple routine first, then fill the main bank with your strings and program.

For example, delete line 1025 and restore line 1020 to its original state. Now, add these lines to your program:

```
132 GOSUB 8500
8500 DIM A$(10000)
8600 A$(1)="A":A$(9999)=A$:A$(2)=A$
8700 RETURN
```

Now, when you press [START] [OPTION], instead of seeing main bank 1 filled with 4's, you see Atari Fuji symbols. You're looking into the heart of A$!

If the DIM statement appears before the banks are filled, the program generates illogical error messages. (Try adding this code between lines 10 and 20 instead). This is an example of the CPU using one bank of main memory while ANTIC uses a bank of extended memory, both at the same address. This limits your program somewhat. It might mean you have to write a two-part program, the first part being a loader for the extended bank.

Notice the program fills the banks with internal codes rather than ATASCII (see *Mapping The Atari*, page 180). This is because the bank area becomes the screen display, bypassing the ATASCII to internal translation routine. In order to display "A" instead of the graphic symbol, change A$(1)="A" to A$(1)="!".

You can use other graphics modes besides GRAPHICS 0 in your displays. Try adding to the original program:

```
4525 GRAPHICS 20:COLOR 1:DRAWTO 20,20
4526 DRAWTO 40,40:DRAWTO 20,20
5000 GOTO 5000
```

However, to display the other screens properly, add a GRAPHICS 0 into the first line of each subroutine, since doing this sets up a GRAPHICS 4+16 display list that won't display anything in the other banks. Another method is to move the entire display list with an associated screen up into the extended area and simply point to the display list instead of the screen memory.

BANK ON THE FUTURE

There are many avenues of exploration open to programmers using the new memory bank. You could write an adventure game with all the rooms entirely in memory, or a scrolling graphics game. You could use the space to store BBS bulletins and sign-on messages.

Since you don't have to use the banks linearly, you could make the main display area the "center" of a game, while "north" would move into one bank—say 3—west into 2, east into 1 and south into 0—all controlled by joystick input. You could use the space to store classic openings in a chess game, use it as a disk I/O buffer or as a print spooler.

As a RAMdisk, it means fast overlay programs that used to be unbearably slow on the old drives. A RAMdisk can also be used to hold graphic screens for games. The possibilities are limitless. . .

RAMDISK

Atari DOS 2.5 creates RAMdisk #8 on the 130XE. Since the RAMdisk occupies all of the extended bank, you'll have to choose between it and your own programming. You can't have both without problems. With the RAMdisk, DOS 2.5 sets the extended bank as D8: and copies MEM.SAV and DUP.SYS to it. You can use it as a very fast 64K drive with 499 sectors. When you type DOS from BASIC, it jumps to DUP.SYS in the RAM area rather than loading from D1:. You can delete MEM.SAV if you don't need it.

Do you want to use DOS 2.5 and extended memory programming? From BASIC, POKE 5439, ASC("1"). This tells DOS to search for DUP.SYS on drive 1. POKE 1802 with the number of drives in your system. Each bit represents a drive from 1 to 8, so POKE with the total of their binary equivalents. If you have two drives, POKE 1802,3—the value of bits 1 and 2 added together.

Now, type DOS and, from the menu, delete the file RAMDISK.SYS. Then write DOS files back to the disk. This disk will now boot with extended RAM but without a RAMdisk.

ADDENDUM

Devices or programs which load the 400/800 Operating System into the 130XE RAM (such as FIX XL or XL BOSS) can also access the additional 64K and use the RAMdisk! Listing 1 works equally well on my 130XE unadorned or using my XL BOSS to switch in the older 400/800 OS. Of course, once you run it, you wipe out DUP. SYS in the extended memory and eliminate the RAMdisk. So you can't take advantage of both at the same time.

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Listing on page 57



Flight Simulator II
For Atari computers with 48K memory
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RAPID GRAPHICS CONVERTER

Now . . . universal picture file compatibility

by CHARLES JACKSON, **Antic** Program Editor

Convert your picture files between any commercial Atari graphics software format—in less than 60 seconds. The Rapid Graphics Converter also overcomes many longstanding compatibility roadblocks. This BASIC program works on all 8-bit Atari computers with 48K and a disk drive.

Rapid Graphics Converter is a supercharged version of Easy Graphic Converter which I wrote for the September 1984 **Antic**. This new program lets you switch disk formats of picture files created with the 10 most popular commercial graphics programs for Atari. It does a file conversion in less than 60 seconds and with fewer compatibility hassles than ever before.

The program works with pictures created on the following software:

- Micro Illustrator (all versions)
- Micropainter (Datasoft)
- Fun With Art (Epyx)
- Paint (Atari or Reston)
- Visualizer (Maximus)
- Moviemaker (Reston)
- Graphics Master (Datasoft)
- Atarigraphics (Atari)
- Graphics Machine (ESI)

Note that Micro Illustrator is the software that's provided (under various names) with a wide variety of graphics products including: KoalaPad, KoalaPen, Atari Touch Tablet, Chalk Board PowerPad and Tech-Sketch Light Pen.

Now you can mix and match the best features of virtually all Atari graphics software in a single picture.

For example, you could tape a photo over your video screen and trace it with a light pen program. Then you could fill in color patterns from your touch tablet software. And you could even animate the scene with MovieMaker!

TYPING IT IN

Type in Listing 1, checking it with TYPO II, and SAVE a copy to disk before you RUN it. If you have problems with lines 630, 900–960 and 1220–1250, don't bother to type them in. Listing 2 will create them for you. When RUN, Listing 2 creates a file called LINES.LST which contains these special lines. Now, type NEW, LOAD listing 1, then ENTER "D:LINES.LST" and SAVE the completed program.

USING RAPID GRAPHICS

After the title screen, you'll see a menu of available conversions. Find the name of the program that you used to create your Source picture, and type in its corresponding number. If you need a disk directory, type a zero.

Type in the filename of your Source picture using the "D:filename" format. To see a directory at this point, type [RETURN] without the filename.

Now type in the menu number and create a different filename for your Destination picture. The conversion begins when you press [START].

EASY ILLUSTRATOR

You don't need to press the [INSERT] or [CLEAR] keys when converting Micro Illustrator pictures—as is required with many "old-fashioned" converters. The Rapid Graphics Converter accepts a compressed Micro Illustrator picture as is.

Micro Illustrator files created by the converter are not compressed—they're always 63 disk sectors long. However, you can still take advantage

continued on next page

of Micro Illustrator's complex machine language compression routines and store many more pictures on your disk. Simply run your Micro Illustrator program, load your converted 63-sector picture and resave it under the same filename.

HIDDEN PAINT FILES

In some versions of Paint software, picture files cannot be accessed by DOS 2 and BASIC.

If your Paint picture files are stored this way, you can load and save them with the converter's Paint (Reston) option. Select number 5 from the menu.

After selecting 5, you can look at a Paint disk directory by typing [RETURN] at the filename prompt. The converter automatically adjusts its disk directory routines to fit your picture file category.

ANIMATION

You can animate your favorite microscreens with the converter and MovieMaker. Just convert that favorite screen into a MovieMaker Background file. Then load it into the MovieMaker program.

MovieMaker lets you change pieces of your background screen into shapes which can be animated and used in your Movie files. For more details, see the Easy Graphics Converter article (**Antic**, September 1984).

Certain graphics products require special filenames, and the converter will not create pictures with illegal filenames.

For example, all Paint picture filenames must have a .PIC extender. All Graphics Machine picture filenames need .SCR extenders. MovieMaker background files must have .BKG extenders. If you forget to type in one of these special extenders, the converter will remind you to include a legal filename.

RESOLUTION SOLUTION

The converter works with pictures drawn in Graphics Modes 7, 8 and 15. Since the pixel size and number of colors available differ among various modes, pictures drawn in one mode may look slightly different when translated into other modes. (See *Figure 1*.)

When picture files are converted from mode 8 (a two color mode) to a mode with more colors, such as four-color mode 15, the converter program adds any necessary default colors. You should also remember that you'll be sacrificing some of the finer details of your high resolution microscreens when converting them to lower resolution.

Finally, feel free to experiment with the converter. If your favorite drawing program isn't mentioned in the main menu, try converting your files with one of the available options. The length of a picture file may help you decide which conversions to try first.

Picture files which are 62 disk sectors long might be loaded as Micro-Painter, Graphics Master or Graphics Machine files. Try the Fun With Art option with picture files slightly longer than 62 sectors.

Micro Illustrator files vary in length from one sector to 63 sectors.

Picture files which are about 31 sectors long might be loaded as Visualizer or Paint (Atari) files.

Programmers wishing to modify the converter should examine the special Break-disable routine in lines 40–70. When you RUN the program normally, the [BREAK] key is disabled. However, if you press the [SELECT] key while typing RUN [RETURN], the [BREAK] key will be enabled, allowing you to halt and examine the program at any point.

Listing on page 59

Figure 1

Graphics Mode 8 (ANTIC mode F)

One foreground color, one background color.
Screen measures 320 columns by 192 rows.
Software: Graphics Master, Graphics Machine.

Graphics Mode 7 (ANTIC mode D)

Three foreground colors, one background color.
Screen measures 160 columns by 96 rows.
Software: Paint, MovieMaker, Visualizer.

Graphics Mode 15 (ANTIC mode E)

Three foreground colors, one background color.
Screen measures 160 columns by 192 rows.
Software: Micro-Painter, Micro Illustrator, Fun With Art, AtariGraphics.

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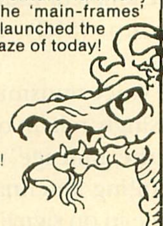
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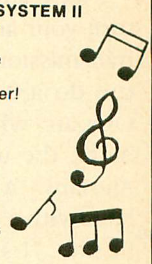
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radio

RADIO ATARI CALLING

Ham satellites, slow scan video, repeater stations, and more . . .

by GIGI BISSON, **Antic** Assistant Editor

Listen to Jack McKirken for a while, and you wonder how amateur radio enthusiasts ever got by *without* personal computers. "Why should you have to hand-turn your antenna to track a satellite transmission, when your computer can do it?," says McKirken. He's an Ohioan who formerly edited Ad Astra, the users newsletter for ham Atarians. "Anything a ham can do, a ham with a computer can do better," he says. "Using the computer to control radio hardware is another job where the Atari shines."

Hook up a short wave radio to your Atari and you could end up with a slow scan television station, a chance to eavesdrop on the space shuttle, and friends all over the world.

You could also end up with an expensive, obsessive, but fascinating hobby. "Oh gosh, ham radio is just as bad as computing," says McKirken with a laugh, "And if you combine the two . . ."

GOOD BUDDIES

They work together as a team, performing feats that neither could do alone. When you combine ham radio and a computer you get (pardon the pun) a computer that likes to show off.

"There are several million hams worldwide. A vast majority of them have computer equipment," says Russell Grokett, chairman of JACE, the Jacksonville, Florida Atari users group. JACE has what is probably the largest and most active amateur radio special interest group (SIG) in Ataridom right now.

Even during simple voice transmissions, hams are increasingly reliant on computers to boost the mileage of their radios by controlling antennas and helping them home in on signals. The computer can figure the maximum or minimum frequencies and decide which is the best radio band to operate on. Hams with computers can even track a moving satellite for the clearest possible signal.

Currently, the most popular use of computerized ham radio is Radio Teletype (RTTY), the ham's equivalent of the computer telecommunications network—without phone bills. Hams with computers upload and download programs, participate in SIGS and operate bulletin board services.

RTTY computing is only as complicated as you let it get. You could start with $100 in used equipment, or a $5,000 base station. "Your antenna can be anything from a simple piece of copper wire to massive aluminum arrays that threaten to cave in the roof of your house," McKirken says.

But hams still insist that no matter how much hardware they accumulate, RTTY is still cheaper than paying through the nose for "online time". At a *peak* speed of 300 baud, however, it's much slower than 1200 baud telecommunications. The other difference between "online" and "on-the-air" is privacy. Anyone with a radio can plug in and listen to ham conversations.

HAM ATARI

It probably comes as a surprise to most people that Atari computers are very popular among RTTY hams. Especially well-liked are the old Atari 800 and 400 models—which were extremely well-shielded against radio interference.

Shielding is important because computers customarily generate lots of radio "noise". This noise can totally jam the sensitive receiver of a nearby ham radio.

The metal casing inside the Atari 800 and 400 prevents interference "leakage." Though the newer XL and XE models do not have this shielding, they also work pretty well with ham radio—a lot better than many other popular brands of computer. (Shield-

ing an XL or XE yourself requires soldering copper sheeting to your main circuit board, or encasing the entire computer in metal. Whether or not you'd need to shield your XL/XE depends on your specific system.)

LICENSE, PLEASE

If you want to operate your own station, instead of merely listening in on other ham transmissions, you must obtain an Amateur Radio License. A Technician Class license requires greater technical knowledge than Novice, the lowest rating. But you don't need to be able to send Morse code any faster, just five words per minute. And a Technician licensee gets many more privileges.

For more information on obtaining a license, contact a local ham radio store. There's also likely to be at least one ham in your local computer users group. If not, contact the American Radio Relay League. (See address at end of article.)

REACHING OUT

Disaster aid has traditionally been very big with hams. During the massive forest fires in California this summer, hams used portable stations to assist firefighters in the field, allowing communication between fire crews who couldn't see each other through the thick smoke.

When power and phone lines are knocked out during a widespread emergency, many battery-operated stations stay on the air and transmit important messages. Through it all, independent, computer-operated repeater stations would keep the communications network going.

Packet communication networks, the hams' version of LANs (Local Area Networks) exist on the east and west coast and will eventually extend across the US according to Grokett.

These packet networks are made up of "repeater stations" that receive a transmission and re-transmit it at higher power. This can dramatically increase the range of less-expensive ham radios.

Repeater stations are usually computer controlled. Most of them are volunteer projects of ham radio organizations. But usually any licensed amateur is allowed to use the repeater.

Grokett's JACE group and other ham organizations have subsidized seven OSCARs (Orbiting Satellites Carrying Amateur Radio) over the years. AMSAT, an amateur satellite construction group, builds them, and the space shuttle launches them. Anyone with a ham radio and a computer can use the satellites to communicate around the world.

Hams with computers can even listen in on NASA conversations on the space shuttle. The computer helps a radio antenna stay precisely focused on the shuttle as it zips through the athmosphere at 17,000 miles per hour.

SLOW SCAN

The next wave in ham computing is slow scan television. This lets computers send and receive color video pictures over the airwaves. Red, blue and green separations are made of each image (as in a photo negative) and each is sent individually over the airwaves, then reassembled by the computer into a complete picture.

Slow scan lives up to its name, however, at a sluggish eight seconds per picture transmission. (Regular television transmission speed is 30 pictures per second.) The final image has about half the resolution of regular television.

The slow scan technique was used to send the first photographs of space back from the Pioneer—in fact an amateur radio enthusiast developed the technique for NASA back in 1958.

Hams have always been involved with experimental uses of radio, and the computer is bringing new levels of sophistication to the hobbyist. For example, McKirken is currently collaborating on the development of a commercial program that, when combined with an 850 interface and an ST 980 Yaesu radio modem, will enable any Atari with 32K or more to take complete control of the radio.

The computer will turn the radio on and off, show a graphic s-meter (representation of signal strength) on the screen, and even push the mike to talk. Such programs enable the user to recieve and send messages even if they're not home, much the same way as a timer turns your lights on while you're on vacation.

And sometimes the computer is just used as a computer. When hams have contests to see how many countries and people they can reach in a given weekend, computers are used to sort out the mountains of resulting paperwork and compile statistics.

The computer is also used to set up parabolic bases that enable hams to pick up commercial satellite TV transmissions in their back yards.

About the only thing hams don't do with computers is play games—unless you consider the on-air radio chess network.

"The big thing about ham is it has always been and always will be amateur," says Grokett, who, when not operating his computer radio network works for AT&T. "It's not allowed to become a profit-making thing," he says.

FOR MORE HELP

If you're interested in getting started in ham computing, here are some places to consult for more information:

American Radio Relay League
This 66-year-old, 100,000-member, worldwide organization is the premier resource for anyone interested in getting involved with

continued on page 46

radio

RADIO MODEMS AND SOFTWARE

RTTY on your Atari

by BILL MARQUARDT (N6CBT)

I have been using my Atari 800 as a radio teletype (RTTY) terminal for well over two years with very good results. RTTY is the ham (amateur) radio equivalent of telecommunications networking.

My home is about 50 miles northeast of San Francisco. Several times a week I broadcast back and forth with Larry Johnson (WB6SVS) an Atari ham who lives just south of SF. The farthest I've ever reached *directly* with my Atari radio system was San Jose, a distance of over 100 miles. And of course there are no phone bills for RTTY. . .

RADIO MODEMS

Once you own a well-shielded Atari and a ham radio, your most important piece of equipment is an interface, a sort of "radio modem."

Radio signals are converted by your receiver into audio signals (tones) and fed by cable into the radio modem. The modem translates these tones into data signals that your Atari can understand, and sends it over another cable into the computer. From there, the data can be displayed on the monitor, sent to a printer, or saved to a disk or cassette. When you transmit, your keyboard input goes by cable to the interface and is translated into audio tones for the radio.

MEET KANTRONICS

Antic invited me to review some recent Atari-compatible radio interfaces and software from Kantronics, a Kansas manufacturer that also publishes a $6-yearly newsletter, "Computers and Amateur Radio." Kantronics is at 1202 E. 23rd Street, Lawrence, KS 66044. (913) 842-7745.

The **Kantronics Interface II** comes with adequate documentation, plus all the cable and connectors you will ever need. It's easy enough to hook up to your Atari and radio, provided that:

1. You can solder well enough to attach the plugs to the cables—or buy the Kantronics software that comes with completed cables.

2. You can understand the meaning of radio jargon such as PTT (Push to Talk).

Like all the other radio modems discussed here, the Interface II requires you to connect a small power supply (that's not included). You can buy an unassembled power pack kit for about $10.

The Interface II performed flawlessly. Its most unusual feature is a pair of switch-selectable input channels. This option lets you choose between VHF and HF wavelengths by flipping a single switch. The Interface II can be tuned with a built-in set of LEDs, or you can plug in an oscilloscope unit.

ADVANCED HAMS ONLY

The **Kantronics UTU** ($199.95) seemed to be as reliable as the Interface II. But it requires an RS-232 serial port—which means you can only use this model with an Atari if you have the 850 Interface Module (See **Antic**, August 1985, page 16.)

The UTU (Universal Terminal Unit) has a built-in ROM that must be accessed with a BASIC program which you'll have to write yourself. The manual offers only a sample program written in IBM BASIC. This is not an interface you can just plug in, it will require some experimentation.

However, the UTU might be the best choice for hams interested in writing their own software, particularly since the built-in ROM allows you to access this device in BASIC. Thus the need for packaged software is eliminated.

MORE MODEMS

Antic also sent me the **RM 1000** by Macrotronics, which is a fantastic piece of hardware. Unfortunately, when I tried to phone some questions to the Turlock, CA manufacturer, I

discovered they were now out of business.

Still, if you ever find an RM 1000 for sale someplace you ought to consider it. It features two LED bar-graphs for tuning both Morse code and radio transmissions, and it excels at rejecting background noise. List price used to be $239, with 32K disk software for $59 or cartridge for $99.

I should mention that my own personal radio modem is the **MFJ RTTY/CW Computer Interface, Model MFJ-1224.** ($99.95). I have been using this LED-tuned unit for some time and am completely satisfied. I was also pleased to find that it works fine with all the Kantronics software I was testing.

Documentation for my MFJ was a scant few pages, but it was adequate to get me hooked up and running without too much trouble. MFJ Enterprises can be reached at P.O. Box 494, Missisippi State, MS 39762. (601) 323-5869.

SOFTWARE

Just as you need special software to use your Atari with a telecommunications modem, you also need software for your ham radio modem.

Kantronics has three software cartridges that work with any 8-bit Atari. Each package includes a completed cable for connecting the computer and the modem, so you won't need to do any soldering.

Hamsoft ($49.95) is the no-frills package. However, current revision AH 2.2 is much improved over the ancient version I have been using in my shack. This software doesn't work with a disk drive. But you can load from cassette as many as 10 frequently used messages (such as your call sign), and then "autodial" them with a single keystroke.

The program is menu-oriented and very easy to use. Morse code can be copied at up to 99 words per minute, and all standard RTTY speeds are supported.

AMTOR

Hamsoft/AMTOR ($79.95) adds to the basic package the capability to use AMTOR. This is a recent ham mode that contains an error checking protocol resembling XMODEM, but it is only allowed on the high frequency (HF) bands. If you will regularly be using your rig on HF bands, then you probably would like this feature.

AMTOR can't be used by a VHF nut like me. I work exclusively in the "two-meter band" which covers the frequencies from 144 to 148 megahertz (MHz). This is a band of frequencies somewhat above the standard FM broadcast stations, which use 88 to 108 MHz. One MHz is one million cycles-per-second.

ULTIMATE HAMWARE

Hamtext ($99.95) is the no-holds-barred version of Kantronics software. I'm so spoiled by testing it for this review that it's hard for me to return it to **Antic** for shipment back to the manufacturer.

The main advantage of Hamtext is that it can handle a disk drive. And it also includes more options than Hamsoft.

Hams can establish their own size limitations on the transmission buffer. Message ports (buffers) use only the amount of memory that the messages actually occupy. This frees the remainder of memory for use as a holding buffer. The buffer can be edited, saved to printer or disk, or viewed onscreen. The operator is thereby free from needing to monitor constantly. I have no hesitation in recommending Hamtext software to anyone who can live without AMTOR.

Bill Marquardt commutes from Fairfield, California to San Francisco for his job with the U.S. Postal Service. He is a member of ABACUS, the San Francisco Atari users group.

MORSE CODE RECEIVER

Atari dots and dashes, 70 words per minute

by STEVE STUNTZ

Morse Code Receiver translates Morse code into ASCII values which your Atari displays as letters or numbers. The BASIC listing creates an assembly language program. The assembly language source code is also provided, but you don't need to type it in. This program works with all 8-bit Atari computers, disk or cassette. You'll also need to build a simple, inexpensive interface described in the article.

"Can I interface my Atari 800 with a shortwave transceiver? I know Morse code can be generated, but can it be received and translated back to ASCII? What type of interface is needed, and what are the costs of such equipment?"

Bill Keaton
Amherst, Ohio

Connect your Atari to a shortwave radio?

Of course!

A few dollars for parts, a few hours of soldering and programming, and your Atari can translate Morse code as quickly as 70 words per minute.

The program can also be used for code practice *without* the interface. Send code with a joystick, or by connecting a Morse code key to the joystick port. You will hear the Morse dots-and-dashes beeping and see letters displayed on the screen as you operate the joystick or key.

MORSE SOFTWARE

The program coverts Morse code at any speed between 5 and 70 words per minute, and it automatically adjusts to any speed changes.

The decoded messages are shown on the screen in inverse video. The message scrolls upward as it fills the screen, and a word wrap routine prevents words from being split at the end of a line.

Listing 1, CODEWRIT.BAS, is a BASIC program which creates the machine language object file called CODEWRIT.EXE. Type in Listing 1, checking it with TYPO II, and SAVE a backup copy to disk or cassette before you RUN it. **Antic** Disk subscribers use the L command in DOS to load CODEWRIT.EXE from the monthly disk.

The CODEWRIT.EXE file can be copied to another disk and renamed AUTORUN.SYS, so that it starts automatically when you insert the disk.

Listing 2, CODEWRIT.M65, is the corresponding assembly language MAC/65 source code. You do not need to type in Listing 2 to use the Morse Code Receiver program.

MORSE HARDWARE

You can build the Atari/Radio interface for under $15. The complete parts list appears at the end of this article.

Assemble the circuit as it appears in *Figure 1*. Note that a 33K-Ohm resistor is connected in series with a 10K-Ohm resistor to duplicate a 43K-Ohm resistor (which was unavailable).

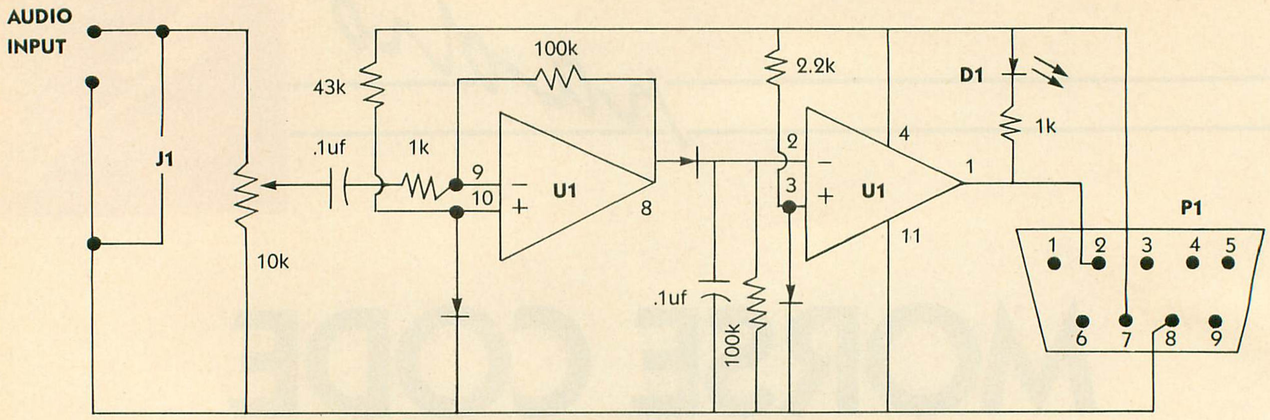
USING THE PROGRAM

To test the program, plug a joystick into Port 1. Quickly pull back on the stick and release it three times. Your monitor should beep three times, and a letter S should appear on your screen.

If you're teaching yourself Morse code, you can continue using the joystick as a Morse code key. Or you can connect a real key to the joystick port as shown in *Figure 2*.

continued on next page

Figure 1
RADIO INTERFACE CIRCUIT



P1—D-Subminiature Female 9 pin plug Radio Shack 276-1538
U1—Quad Operational Amplifier LM-324 Radio Shack 276-1711
D1—Green LED Radio Shack 276-022
J1—Earphone Jack

Now you're ready to receive some code. Boot the Morse Code Receiver program. Make sure the interface circuit is connected to joystick port 1.

Find a strong broadcast signal with little background noise. Plug your interface circuit into your radio's earphone jack. Carefully adjust the interface's potentiometer so that the LED blinks on and off in time with the code. In a moment, your Atari will display the decoded message, one letter at a time.

From time to time, the program may misinterpret one or two characters. This occurs because the program is adjusting its timing loop and does not yet have enough information to distinguish dots from dashes.

PROGRAM ANALYSIS

The timing loop (lines 1820–1970 in Listing 2) is controlled with display list interrupts. This loop checks the status of pin #2 of the joystick port. When the computer is receiving a signal (either a dot or a dash), this pin is grounded. Otherwise the pin is open.

The timing loop checks the status of this pin 120 times per second, and stores the number of interrupts occurring between each status change. This value is stored in the timing buffer. Each time the status of pin #2 changes, the number of intervening interrupts is stored in the next memory location of the timing buffer.

This process continues until all 256 bytes of the timing buffer are used. Then the buffer is cleared and used again.

The CW character loop (lines 2000–2070 in Listing 2) determines if the timing buffer contains useful timing information. If this is so, the routine uses the timing information to begin reconstructing the proper Morse code character.

The program observes the following conventions when handling Morse code timing information:

1. A dot is represented by 0.
2. A dash is represented by 1.
3. A Morse code word is read from right to left.
4. The last 1 encountered when reading from right to left indicates the end of the character.

The routine will continue reading and decoding timing information until it encounters a character space. Then, the program looks up the ASCII equivalent of the decoded character, prints it to the screen and returns for more code.

For example, the letter A (a dot followed by a dash) sent at 18 words per minute causes the computer to store the numbers 8, 24, 24, 36 in the timing buffer.

Then the CW character loop converts those four numbers into one Morse character and finds its corresponding ASCII character to display on the screen.

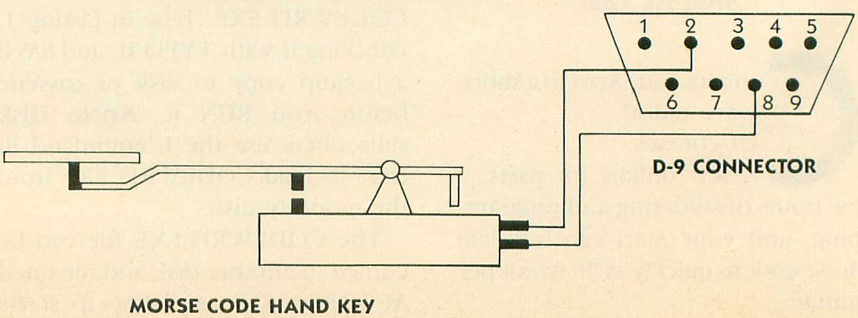
Remember that the program needs a fairly clear signal to operate properly. However, I've managed to copy signals sent from locations all over the world.

PARTS LIST

D-9 Female Joystick Connector. Radio Shack #276-1538 or equivalent.

continued on page 46

Figure 2
CW HAND KEY CONNECTION



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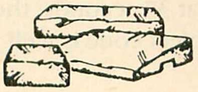
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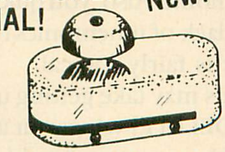
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KYAN PASCAL

True Pascal for Atari, at last

Reviewed by RAY COLE

Finally there is a Pascal for the Atari that doesn't require two disk drives and a computer science degree! If you're looking for a fast version of Standard Pascal for your single drive Atari, **Kyan Pascal** is the language for you.

Pascal was developed by Professor Niklaus Wirth of Switzerland in the late '60s. Designed as a learning language, Pascal emphasizes structured programming which promotes good programming technique. It has become the first language taught to new students of engineering and computer science.

Those not familiar with Pascal will find it is similar to the ACTION! or C languages. The object code is compiled from text source code. Kyan Pascal includes an editor for source code, as well as the compiler and some extension files.

There are two Pascal "dialects." One was designed for microcomputers at the University of California, San Diego and is accordingly called UCSD Pascal. The other is Standard Pascal. Kyan is Standard Pascal with a few additions and extensions.

FEATURES

Kyan Pascal supports all of the features that make Pascal great—global and local procedures, pointers for linked lists and binary trees, two-dimensional arrays, arrays of records, variant records, recursion, etc., etc.

In short, it has all the features you would expect from any Standard Pascal on any other computer. And Kyan Software has done Pascal for the Atari at only $69.95!

COMPILER

The Kyan Pascal compiler is reasonably fast and effective. Unlike UCSD Pascal, Kyan Pascal text files are compiled directly into assembly language. The compiler, in addition to locating errors, produces a complete assembly language listing which you can send to the screen and/or the printer. But unfortunately, there is no way to save this listing to disk for fine tuning.

The assembly language listing is next assembled to produce the object code file which can be run from DOS without Kyan Pascal. (Though you will need to append the library files or at least put them on the same disk.)

The resulting object file has a very rapid run-time. Ten iterations of the Eratosthenes Prime Number Sieve (see "First ST Performance Test," **Antic**, October 1985) ran in about 120 seconds with the screen on. With the screen off, the same program ran in just 80 seconds.

Compare this to the eight and a half minutes it took UCSD Pascal on the Apple IIe, or the eight minutes and 55 seconds it took Atari BASIC to complete the task.

The biggest drawback of the compiler is the 35 seconds it takes to load. If you have a 130XE, you can put the compiler in the RAMdisk and save yourself the half-minute load time. But even at 35 seconds, the resulting speedy object code is well worth the wait!

EDITOR

The Kyan Pascal editor commands are hardly mnemonic and do not take advantage of the familiar Atari screen editor. However, programmers familiar with Wordstar or Turbo Pascal will be right at home. Also, you quickly adjust to the lack of mnemonics because the layout is fairly logical.

Deletions may take getting used to. [SHIFT] [DELETE] wipes out a single character the way you would expect [CONTROL] [DELETE] to work. To delete a line, you have to use [CONTROL] [Y].

A "search and replace" feature is included in the editor, but unfortunately there is no "copy block" command. Also, *the tab key does nothing at all*, and there is no substitute!

In a language like Pascal, where everything is indented, that tab key is sorely missed. If you do any complicated loop nesting, you'll find yourself hitting the space bar about five to ten times before each line.

Because the compiler requires only that the source file be DOS compatible, you might be better advised to use a text editor you're more comfortable with.

ASSEMBLER

Kyan Pascal contains an assembler which can be used to embed machine language routines in the middle of any procedure, function, or main program body. It is also possible—though somewhat cumbersome—to pass information between the ML routines and the Pascal programs, procedures, and functions.

OPERATING SYSTEM

Ideally, an operating system should be so easy to use that you don't notice it exists at all. But Kyan Pascal's operating system is far from ideal.

To load the program compiler, the manual says: Type PC. Actually, you must type D:PC. When the editor prompts you for the name of the file you want to edit, do you type CONSTRUC? No, you have to type D:CONSTRUC.

Every time you access a file from the disk, you must remember to include the device. This is not only silly, it's aggravating. When the compiler asks for the name of the file to compile, you'd better remember to put that D: before the filename, or you'll have to reload the compiler!

There are other inconveniences. You cannot get a disk directory without going to DOS. And if you try to reload the editor after running a program that uses graphics, the computer locks up. Hopefully these glitches will be smoothed out in later releases.

DATA TYPES

Kyan Pascal allows the use of both capitals and lowercase letters for naming variables or writing the program itself. It does not, however, permit underscores. Thus, Variable Name is okay, but Variable_Name is not.

Most of the important data types for variables are supported, including integer, real, char, and Boolean. In addition, Kyan Pascal allows user-defined subrange and enumerated types.

The type, double precision is not a required part of any Pascal and is left out of Kyan Pascal. It is not needed anyway, since this implementation yields an amazing 13 digits of accuracy with regular type real variables!

UCSD Pascal programmers may at first lament the loss of the predefined data type string, since the only way to simulate string variables in Kyan Pascal is by setting up an array of characters. However, a small library of string routines comes with the language and can be included in your programs.

One problem with Kyan strings is the relational operators, "<" and ">." These work only on the first letter of each of the compared strings. For example, suppose Word = 'ANTIC' and FirstWord = 'ATARI', then the line:

```
If Word < FirstWord then
FirstWord := Word;
```

will *not* set FirstWord equal to ANTIC as we would like. This tends to make sorting tasks a bit more difficult than they should be.

Assignment statements are a little inconvenient too, since all of the character array elements *must* be filled. For example, given the following declarations:

```
Type String: array[1..15] of char;
Var Magazine: String;
```

the assignment statement Magazine: = 'Antic' will not work. You must use Magazine: = 'Antic   ' so that there are exactly 15 characters between the quotes. A readln adds the trailing blanks automatically, and you can truncate them in a writeln by including the function LENGTH in your program and using the length as a field specification. Thus:

```
writeln(Magazine :
LENGTH(Magazine));
```

will print out all characters up to but not including the first blank. I had to call the company to find this out, though. It's not explained anywhere in the manual.

DOCUMENTATION:

Documentation is, unfortunately, pretty poor. The spiral-bound instruction manual contains many errors, not all of which are typos. And the most serious are those of omission, such as the above-mentioned LENGTH function.

I also disagree with the included sample programs which, I feel, set bad examples for programmers new to Pascal. The programs don't make use of procedures as much as they should, the commenting is weak, and the indenting format is inconsistent.

Of course, the manual does not claim to be a Pascal instruction book and users unfamiliar with the language should definitely purchase a separate book (I recommend *PASCAL: An Introduction To The Art And Science Of Programming* by Walter J. Savitch. Benjamin/Cummings Publishing Company, Inc., 1984.)

EXTENSIONS

Kyan Pascal includes a few extensions to the standard. The ASSIGN procedure permits a crude sort of PEEK and POKE, and PRON and PROFF will redirect writeln output to the printer instead of the screen.

continued on next page

With the command "#i", you can include procedures from one program into another. With the command "#a" you can insert an assembly language routine. Provisions have been made to allow chaining programs together and passing variable values between chained programs.

GRAPHICS BONUS

Version 1.1 contains a library of graphics routines for the Atari. There are six files which simulate the BASIC commands GRAPHICS, PLOT, DRAWTO, SETCOLOR, POSITION, and LOCATE.

Though the language is fast, it's not quite fast enough to produce arcade quality games. But if you've been writing your games in BASIC you'll find Kyan Pascal to be significantly faster—and easier to use.

Unfortunately, there are no dedicated commands for Player/Missile graphics and no equivalent to the BASIC SOUND statement. And you'll have to write assembly language routines to create these functions in Pascal.

BOTTOM LINE

Kyan Pascal is exactly what it claims to be—a good, solid, fast version of Standard Pascal. And there lies the disappointment. With just a few additions, it could have been so much more.

Its deficiencies lie mostly in the lack of extensions to the Standard. In general, Kyan Pascal is terrific as long as you don't particularly care about writing programs that make use of features that are unique to the Atari.

Nevertheless, Kyan Pascal plus a good book makes a painless way to introduce yourself to Pascal programming. If you are taking a class in Pascal and want to do some work at home, Kyan Pascal is a must. If you use Pascal at the office and want to write programs at home on your Atari, again, Kyan Pascal is the package for you.

Nearly everything that BASIC does without assembly language can be done faster and more easily with Kyan Pascal. At this price, its worth looking into.

This package is available from Kyan Software, 1850 Union Street, #183, San Francisco, CA 94123, (415) 775-2923, on 64K disk, (XL/XE models only) for $69.95.

(Note: At this writing, Kyan Pascal was only available for XE and XL computers. According to the manufacturer, the 400/800 version will be available within two to three months. If you own an older machine, be sure and contact Kyan before ordering.—ANTIC ED)

Ray Cole is a junior at UCSD, majoring in Engineering. He's been programming in Pascal on his Atari—as well as on minicomputers—for over two years. Ray teaches introductory Pascal classes on Apple computers.

MORSE CODE RECEIVER
continued from page 42

LM-324 Quad Operational Amplifier. Radio Shack #276–1711 or equivalent.

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2.2K-Ohm, 1/4 Watt Resistor. Radio Shack #271–1325 or equivalent.

33K-Ohm, 1/4 Watt Resistor. Radio Shack #271–1341 or equivalent.

10K-Ohm, 1/4 Watt Resistor. Radio Shack #271–1335 or equivalent.

Two 0.1uf Capacitors. Radio Shack #272–135 or equivalent.

14-pin DIP Socket. Radio Shack #276–1999, or equivalent.

Miscellaneous: Radio earphone jack and plug, wire, PC board.

Steve Stuntz is an electrical engineer from Loveland, CO.

Listing on page 54

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continued from page 37

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Atari Microcomputer Network
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HAMNET
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JACE
The Jacksonville, Florida Atari user's group is a good source of public domain ham software. Out-of-state members are invited. Call their 24-hour BBS (FOREM 300/1200 baud) at (904) 733-4515. The sysop is a ham who may be able to answer your questions. Or write: Russell Grokett, 1187 Dunbar Court. Orange Park, FL 32073

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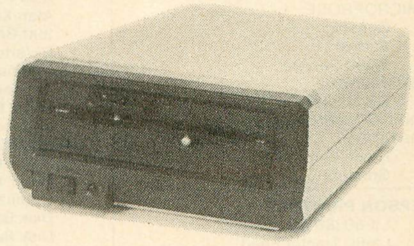
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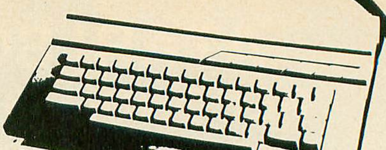
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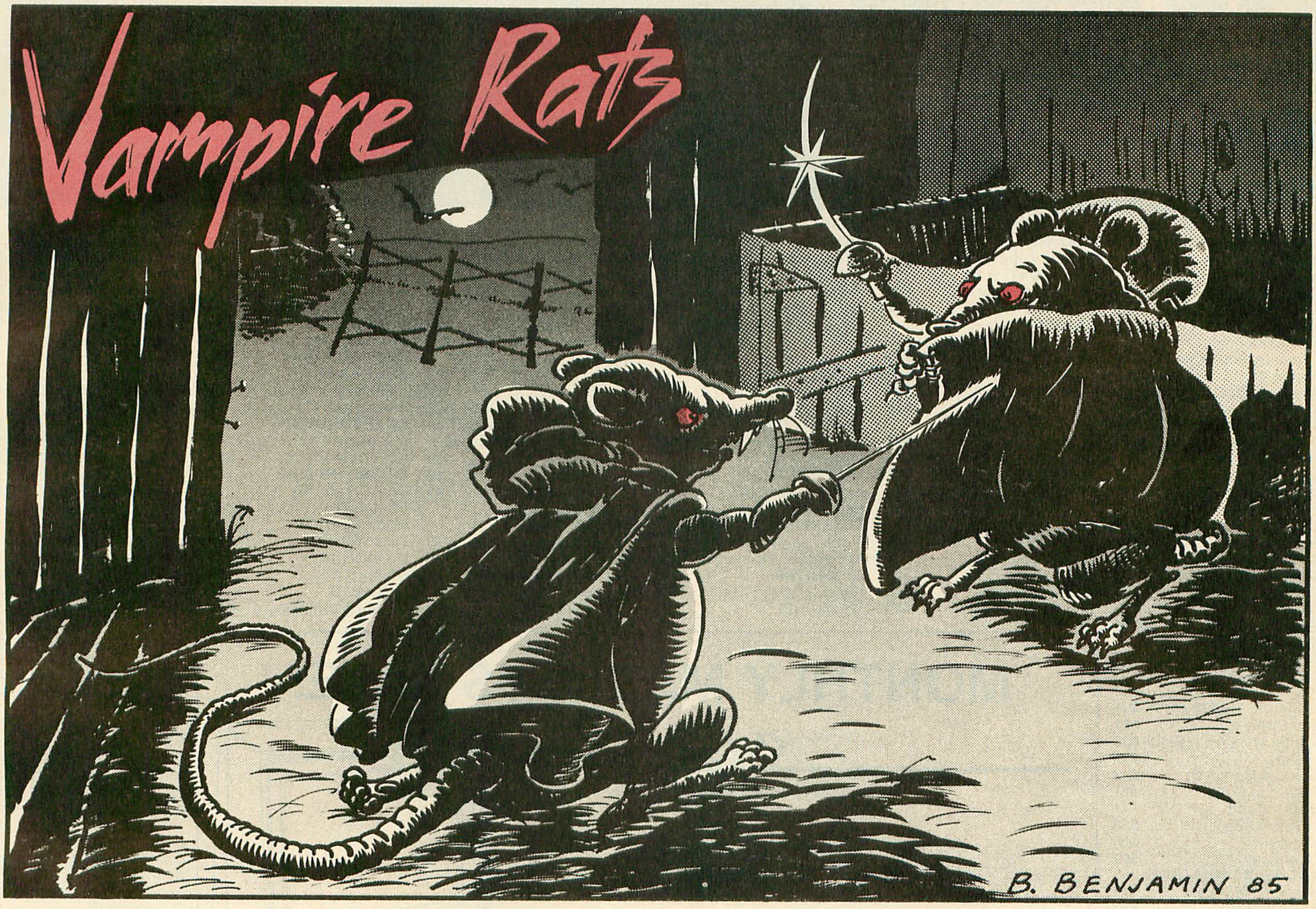
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by TOM ZARBOCK

In honor of the Halloween season, ***Antic*** *presents one of the strangest arcade games we have ever published. Join the Vampire Rats as they stalk each other (and any innnocent passers-by) in the midnight barnyard. The program for this two-player BASIC game works on all Atari computers of any memory size, with disk or cassette.*

This barnyard isn't big enough for Count Ratula and Vampirodent. So they are fighting a duel to the death. Only one mighty Vampire Rat can survive to become. . .Transylvania's King for a Day!

To enlist in this supernatural free-for-all, type in Listing 1. Check it with TYPO II and SAVE a copy before you RUN it. After the Grade-B horror movie title screen appears, press the joystick button to start the game.

DUELING VAMPIRES

Pushing the joystick forward makes your vampire advance. Moving the stick to the right or left pivots the vampire like an early videogame tank. To turn and move simultaneously, hold down the joystick button as you manipulate the stick. The ominous sound effects for each action are definitely worthy of a cheapo monster movie.

Vampire Rats cannot move backwards. Pulling back on the joystick causes the rat to jump forward. A jumping rat moves faster and can leap over obstacles—but each jump costs the rat some extra "blood energy."

Blood energy levels for both rats are displayed with red bars at the opposite sides of the screen. Vampire Rats slowly lose blood as time passes—unless they can replenish their supply from some of the randomly appearing victims—or from each other.

When blood level becomes dangerously low, the rat darkens in warning. Zero blood level loses the game.

VAMPIRE ATTACK

Vampire Rats cannot move onto a spot that is already occupied, but that doesn't make them any less dangerous. In order to drain an opponent or victim, Vampire Rats must simply be:

(1) Right next to them.

(2) Pointed forward at them.

Draining is automatic and does not require pressing the joystick button. Each successful attack is accompanied by a sizzling zap sound.

Good luck, Children of the Night. Don't bump into any garlic wreaths.

Tom Zarbock is a business administration major from San Juan Capistrano, in Southern California.

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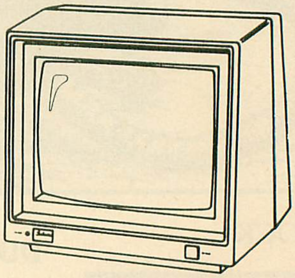
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Antic program listings are typeset on the Star's SG-10 printer—from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789 0123456789

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below. (Squares are drawn around the normal video characters so you can see their positions more accurately, these squares will not appear in listings.)

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL T
	CTRL A		CTRL U
	CTRL B		CTRL V
	CTRL C		CTRL W
	CTRL D		CTRL X
	CTRL E		CTRL Y
	CTRL F		CTRL Z
	CTRL G		ESC ESC
	CTRL H		ESC CTRL –
	CTRL I		ESC CTRL =
	CTRL J		ESC CTRL +
	CTRL K		ESC CTRL *
	CTRL L		CTRL .
	CTRL M		CTRL ;
	CTRL N	|	SHIFT =
	CTRL O		ESC SHIFT CLEAR
	CTRL P		ESC DELETE
	CTRL Q		ESC TAB
	CTRL R		
	CTRL S		

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	人CTRL ,		人CTRL Y
	人CTRL A		人CTRL Z
	人CTRL B		ESC SHIFT DELETE
	人CTRL C		ESC SHIFT INSERT
	人CTRL D		ESC CTRL TAB
	人CTRL E		ESC SHIFT TAB
	人CTRL F		人CTRL .
	人CTRL G		人CTRL ;
	人CTRL H		人SHIFT =
	人CTRL I		ESC CTRL 2
	人CTRL J		ESC CTRL DELETE
	人CTRL K		ESC CTRL INSERT
	人CTRL L		
	人CTRL M		
	人CTRL N		
	人CTRL O		
	人CTRL P		
	人CTRL Q		
	人CTRL R		
	人CTRL S		
	人CTRL T		
	人CTRL U		
	人CTRL V		
	人CTRL W		
	人CTRL X		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key. Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key 人 instead.) Note: In the printed listings, inverse characters will be slightly smaller than the normal ones.

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be *thicker* than the alpha-numerics. Compare the two sets of characters below:

SPECIAL		STANDARD	
/	CTRL F	/	/
\	CTRL G	\	SHIFT +
—	CTRL N	—	SHIFT -
–	CTRL R	–	-
+	CTRL S	+	+

HOW TO USE TYPO II

TYPO II is the improved automatic proofreading program for **Antic's** type-in BASIC listings. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at left of the line number. Press [RETURN].

Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "K":POSITION 11,1:? "TYPO II"
EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
```

Don't type the TYPO II Codes!

```
ET 32120 ? "K":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press RETURN and edit line a
   bove.":GOTO 32050
```

ERROR FILE

ATARI 'TOONS

August 1985

The 22nd character in line 1090 of listing 2 is an A. Also, to load non-standard character sets, change NUMBER=1024 in line 1140 to: NUMBER=2050, and change line 1150 to: 1150 GOTO 1170.

GUESS THAT SONG

July 1985

The September, 1985 HELP! section contains an easier-reading listing of some of the tougher data lines in Guess That Song.

STAR VENTURE

July 1985

Change line 380 to:

```
380 IF PEEK(53279
)=6 THEN SOUND 0,
0,0,0:GOTO 80
```

MUSICIAN

June 1985

Change line 790 to:

```
790 IF A=54 THEN
POSITION 4,22:? #
6;"song cleared":
GOTO 810
```

And if you're having tempo problems, remove line 1720 and add the following:

```
1715 IF A=14 THEN
 TEMPO=-0.25:GOTO
 1700
1720 REM REMOVE T
HIS LINE
```

MANEUVER

April 1985

If you get hearts on the title screen, LIST the program to disk or cassette, type NEW, then ENTER and SAVE it.

FONT MAKER FOR SG-10

March 1985

The July 1985 issue of ANTIC contains a listing which, when merged with FONT MAKER, makes that program work on the Star SG-10. See the HELP section of that issue for instructions.

CUSTOM PRINT

March 1985

Custom Print has problems printing certain characters using re-defined characters. Change line 5 to:

```
5 CS=PEEK(106)-8:
POKE 106,CS-1:GRA
PHICS 0:DIM CST$(
20):CST$=""
```

Atari dots and dashes, 70 words per minute

MORSE CODE RECEIVER

Article on page 41

LISTING 1

Don't type the TYPO II Codes!

```
WM 10 REM CODEWRITER III
PT 20 REM BY STEVE STUNTZ
FW 30 REM (c) 1985, ANTIC PUBLISHING
FD 40 DIM FN$(20),TEMP$(20),AR$(93):CASS=
   0
EZ 42 FN$="D:CODEWRIT.EXE":TRAP 44:CLOSE
   #1:OPEN #1,4,0,"D:*.*":CLOSE #1:GOTO 5
   0
KF 44 FN$="C:":CASS=128
MO 50 TRAP 160
BE 60 ? :? "KCreating the MORSE CODE RECE
   IVE":? "machine language program."
GL 100 POSITION 2,4:? "Working...please s
   tand by"
LO 110 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BI 120 AR$="":READ AR$
XU 130 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DE 140 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")      "
SU 150 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 120
OM 160 IF CASS=128 THEN ? :? :? "Prepare
   tape, press [RETURN].":GOTO 180
VE 172 ? :? "Press [START] to write file
   to disk."
EC 174 IF PEEK(53279)<>6 THEN 174
TW 180 CLOSE #1:OPEN #1,8,CASS,FN$
IT 186 ? :? "Writing to ";FN$
SQ 190 ? #1;A$;
KY 200 CLOSE #1
RS 210 GRAPHICS 0:? "■COMPLETED■"
JR 1000 DATA 852
IL 1010 DATA 2552550001282511280320381291
   69056141002211169001141000211169060141
   0022111690011410002111173048
ID 1020 DATA 002133180173049002133181169l
   30160012145180160028145180169063141000
   0021691291410010021692551 41
RY 1030 DATA 228132141229132169032141231l
   32169064141230132169015141232132169000
   141241132141234132141235132
HI 1040 DATA 141236132141237132141238132l
   41239132141240132169002141233132173223
   130133178173224130133179169
BH 1050 DATA 192141014212032131129076122l
   28224006208017164084192023208011164085
   192039208005160001140241132
WG 1060 DATA 168189001228072189000228072l
   52096172241132192001208008032045129160
   000140241132096164085192034
FZ 1070 DATA 144015192039240011169160032O
   12130164085192039208245096201002208013
   160000140000211160047140001
HB 1080 DATA 210076225128160001140000211l
   60000140001210096160000140225131185185
   130162006032128128238225131
XZ 1090 DATA 172225131192038208238096165O
   84252128247129141226131165085141227131
   169000133084169002133085096
DI 1100 DATA 173226131133084173227131133O
   85169030162006032128128169031162006032
   128128096032055129032226128
UF 1110 DATA 096032250128032226128032013l
   29096169125162006032128128096072152072
   032093129169000133077173000
BN 1120 DATA 211041002205233132208003076O
   89129032109129104168104064172228132177
   178205230132240005024105001
HX 1130 DATA 145178096238228132173233132O
   32198128073002141233132172228132169000
   145178096032198129173237132
EM 1140 DATA 201001208027238229132032081l
   30169001077234132141234132201001208006
   032169129076168129032233129
QK 1150 DATA 096173235132201007240021238Z
   35132172229132177178205232132144004056
   076194129024110236132096174
LM 1160 DATA 229132236228132240016232236Z
   28132208015172228132177178205230132240
   005169000076229129169001141
ML 1170 DATA 237132096172229132177178205Z
   32132144024032021130032051248129243130
   130172229132177178205231132
FT 1180 DATA 144008032176128169160032012l
   30096162006032128128032160128096056110
   236132238235132173235132201
AX 1190 DATA 008176010024110236132238235l
   32076028130169000141235132096162040189
   225130205236132240013232224
DI 1200 DATA 091240003076053130169063076O
   75130138073128032012130096174238132232
   224016240026238238132172229
YZ 1210 DATA 132177178024109239132141239l
   32169000109240132141240132076118130032
   119130096024110240132110239
PS 1220 DATA 132024110240132110239132173Z
   39132141230132024110239132173239132141
   231132024110239132173239132
AF 1230 DATA 141232132024110239132173239l
   32024109231132141231132169000141239132
   141240132141238132096032032
ZN 1240 DATA 067111100101119114105116101l
   14032073073073032032032032032032066089
   032083084069086069032083084
RU 1250 DATA 085078084090032228131000000
   000000000000000000000000000000000000000
   000000000000244130059131000
AR 1260 DATA 000000000000000000000000000
   00000000254000000000000000000000109109
   034042115104106041063062060
CD 1270 DATA 056048032033035039047071085
   55049255076000000601702100900202001101
   6004030013018007005015022027
MZ 1280 DATA 010008003012024014025029019
   2240022250020000128
```

LISTING 2

```
10 ;CODEWRITER III
20 ;BY STEVE STUNTZ
30 ;(c) 1985, ANTIC PUBLISHING
40 ;
50          *=   $8000
55 START
60 MEM      =    $B0
70 VTBASE =      $E400
80 SETVBV =      $E45C
90 PACTL =       $D302
0100 PORTA =     $D300
0110 AUDC1 =     $D201
```

```
0120 CH    =    $02FC
0130 CDTMA1 = $0226
0140 ROWCRS = $54
0150 COLCRS = $55
0160 VDSLST = $0200
0170 NMIEN = $D40E
0180 SDLSTL = $0230
0185 ATRACT = $4D
0190 MEMINT = $B4
0200 MEMRX = $B2
0210       JSR HEAD1
0220       LDA #$38
0230       STA PACTL
0240       LDA #$01
0250       STA PORTA
0260       LDA #$3C
0270       STA PACTL
0280       LDA #$01
0290       STA PORTA
0300       LDA SDLSTL
0310       STA MEMINT
0320       LDA SDLSTL+1
0330       STA MEMINT+1
0340       LDA #$82
0350       LDY #12
0360       STA (MEMINT),Y
0370       LDY #28
0380       STA (MEMINT),Y
0390       LDA #RXLOOP&255
0400       STA VDSLST
0410       LDA #RXLOOP/256
0420       STA VDSLST+1
0430       LDA #$FF
0440       STA POINTRI
0450       STA POINTRO
0460       LDA #$20
0470       STA CWSPC
0480       LDA #$40
0490       STA CWMAX
0500       LDA #$0F
0510       STA CWAVG
0520       LDA #$00
0530       STA I23X37
0540       STA HILO
0550       STA NBITS
0560       STA RXCW
0570       STA IAMREDI
0580       STA CTAVG
0590       STA CWTOT
0600       STA CWTOT+1
0610       LDA #2
0620       STA PREVHILO
0630       LDA MRX
0640       STA MEMRX
0650       LDA MRX+1
0660       STA MEMRX+1
0670       LDA #$C0
0680       STA NMIEN
0690 ;
0700 ;SEARCH FOR KEYBOARD CHARACTER
0710 LP1 JSR RXCH
0720       JMP LP1
0730 ;
0740 ; DEVICE HANDLER
0750 GOVEC CPX #6
0760       BNE GOV1
0770       LDY ROWCRS
0780       CPY #23
0790       BNE GOV1
0800       LDY COLCRS
0810       CPY #39
0820       BNE GOV1
0830       LDY #1
0840       STY I23X37
0850 GOV1 TAY
0860       LDA VTBASE+1,X
0870       PHA
0880       LDA VTBASE,X
0890       PHA
0900       TYA
0910       RTS
0920 ;
0930 ; SCROLL
0940 SCROLL LDY I23X37
0950       CPY #1
0960       BNE SCROL1
0970       JSR HEAD3
0980       LDY #0
0990       STY I23X37
1000 SCROL1 RTS
1010 ;
1020 ; RX WORD WRAP
1030 RXWRA LDY COLCRS
1040       CPY #34
1050       BCC RXWR9
1060       CPY #39
1070       BEQ RXWR9
1080 RXWR1 LDA #$A0
1090       JSR RXPNT
1100       LDY COLCRS
1110       CPY #39
1120       BNE RXWR1
1130 RXWR9 RTS
1140 ;
1150 ;SET PIN1 AND SOUND
1160 ONOFF CMP #$02
1170       BNE OFF
1180       LDY #$00
1190       STY PORTA    SET PIN1 LOW
1200       LDY #$2F
1210       STY AUDC1    TURN SOUND ON
1220       JMP ONOF1
1230 OFF LDY #$01
1240       STY PORTA    SET PIN1 HIGH
1250       LDY #$00
1260       STY AUDC1    TURN SOUND OFF
1270 ONOF1 RTS
1280 ;
1290 ;HEADING
1300 HEAD LDY #$00
1310       STY COPYI
1320 CR1 LDA COPYR,Y
1330       LDX #6
1340       JSR GOVEC
1350       INC COPYI
1360       LDY COPYI
1370       CPY #38
1380       BNE CR1
1390       RTS
1400 ;
1410 ;SET CURSOR AT 0,0
1420 HEAD00 LDA ROWCRS
1430       STA ROW
1440       LDA COLCRS
1450       STA COL
1460       LDA #$00
1470       STA ROWCRS
1480       LDA #$02
1490       STA COLCRS
1500       RTS
1510 ;
1520 ;SET CURSOR AT ORIGINAL POSITION
1530 HEADORG LDA ROW
1540       STA ROWCRS
1550       LDA COL
1560       STA COLCRS
1570       LDA #$1E
1580       LDX #6
1590       JSR GOVEC
1600       LDA #$1F
1610       LDX #6
1620       JSR GOVEC
1630       RTS
1640 ;
1650 ;KEYBOARD HEADING
1660 HEAD1 JSR HEADCLR
1670       JSR HEAD
1680       RTS
1690 ;
```

continued on next page

```
1700 ;CHANGE SPEED HEADING
1710 HEAD3 JSR HEAD00
1720       JSR HEAD
1730       JSR HEADORG
1740       RTS
1750 ;
1760 ;
1770 HEADCLR LDA #$7D
1780       LDX #6
1790       JSR GOVEC
1800       RTS
1810 ;
1820 ; RX INTERRUPT LOOP
1830 RXLOOP = *
1840       PHA
1850       TYA
1860       PHA
1870       JSR CWCOUNT
1872       LDA #0
1874       STA ATRACT
1880       LDA PORTA
1890       AND #$02
1900       CMP PREVHILO
1910       BNE RI1
1920       JMP RI2
1930 RI1 JSR CHANGE
1940 RI2 PLA
1950       TAY
1960       PLA
1970       RTI
1980 ;
1990 ; RX CW COUNT BY 1
2000 CWCOUNT LDY POINTRI
2010       LDA (MEMRX),Y
2020       CMP CWMAX
2030       BEQ RC1
2040       CLC
2050       ADC #$01
2060       STA (MEMRX),Y
2070 RC1 RTS
2080 ;
2090 ; DETECT CW CHANGE
2100 CHANGE INC POINTRI
2110       LDA PREVHILO
2120       JSR ONOFF
2130       EOR #$02
2140       STA PREVHILO
2150       LDY POINTRI
2160       LDA #0
2170       STA (MEMRX),Y
2180       RTS
2190 ;
2200 ;
2210 ; RX CHARACTER FROM PIN 2
2220 RXCH JSR READY
2230       LDA IAMREDI
2240       CMP #1
2250       BNE RX02
2260       INC POINTRO
2270       JSR COUNTAVG
2280       LDA #1
2290       EOR HILO
2300       STA HILO
2310       CMP #1
2320       BNE RX01
2330       JSR SHIFT
2340       JMP RX02
2350 RX01 JSR FINDCH
2360 RX02 RTS
2370 ;
2380 ; SHIFT ROR BUILD NBITS
2390 SHIFT LDA NBITS
2400       CMP #7
2410       BEQ SHIFT9
2420       INC NBITS
2430       LDY POINTRO
2440       LDA (MEMRX),Y
2450       CMP CWAVG
2460       BCC SHIFT1
2470       SEC            ;DASH
2480       JMP SHIFT2
2490 SHIFT1 CLC       ;DOT
2500 SHIFT2 ROR RXCW
2510 SHIFT9 RTS
2520 ;
2530 ; READY TO READ COUNT
2540 READY LDX POINTRO
2550       CPX POINTRI
2560       BEQ READY1
2570       INX
2580       CPX POINTRI
2590       BNE READY2
2600       LDY POINTRI
2610       LDA (MEMRX),Y
2620       CMP CWMAX
2630       BEQ READY2
2640 READY1 LDA #0
2650       JMP READY3
2660 READY2 LDA #1
2670 READY3 STA IAMREDI
2680       RTS
2690 ;
2700 ; FIND CW CHARACTER
2710 FINDCH LDY POINTRO
2720       LDA (MEMRX),Y
2730       CMP CWAVG
2740       BCC FIND09
2750       JSR FINISHCH
2760       JSR LOOKASCI
2770       LDY POINTRO
2780       LDA (MEMRX),Y
2790       CMP CWSPC
2800       BCC FIND09
2810       JSR RXWRA
2820       LDA #$A0
2830       JSR RXPNT
2840 FIND09 RTS
2850 ;
2860 ; PRINT RECEIVED DATA
2870 RXPNT LDX #6
2880       JSR GOVEC
2890       JSR SCROLL
2900 RXPN1 RTS
2910 ;
2920 ; FINISH RXC2 CHARACTER
2930 FINISHCH SEC
2940       ROR RXCW
2950       INC NBITS
2960 FINISH1 LDA NBITS
2970       CMP #8
2980       BCS FINISH9
2990       CLC
3000       ROR RXCW
3010       INC NBITS
3020       JMP FINISH1
3030 FINISH9 LDA #0
3040       STA NBITS
3050       RTS
3060 ;
3070 ; LOOKUP AND PRINT CHARACTER
3080 LOOKASCI LDX #40
3090 LOOK1 LDA CWCHA,X
3100       CMP RXCW
3110       BEQ LOOK3
3120       INX
3130       CPX #91
3140       BEQ LOOK2
3150       JMP LOOK1
3160 LOOK2 LDA #63
3170       JMP LOOK4
3180 LOOK3 TXA
3190 LOOK4 EOR #$80
3200       JSR RXPNT
3210       RTS
3220 ;
3230 ; COUNT FOR AVERAGE
3240 COUNTAVG LDX CTAVG
3250       INX
3260       CPX #16
3270       BEQ COUNTA1
```

```
3280       INC CTAVG
3290       LDY POINTRO
3300       LDA (MEMRX),Y
3310       CLC
3320       ADC CWTOT
3330       STA CWTOT
3340       LDA #0
3350       ADC CWTOT+1
3360       STA CWTOT+1
3370       JMP COUNTA2
3380 COUNTA1 JSR CALCAVG
3390 COUNTA2 RTS
3400 ;
3410 ; CALCULATE AVERAGE
3420 CALCAVG CLC
3430       ROR CWTOT+1
3440       ROR CWTOT
3450       CLC
3460       ROR CWTOT+1
3470       ROR CWTOT
3480       LDA CWTOT
3490       STA CWMAX
3500       CLC
3510       ROR CWTOT
3520       LDA CWTOT
3530       STA CWSPC
3540       CLC
3550       ROR CWTOT
3560       LDA CWTOT
3570       STA CWAVG
3580       CLC
3590       ROR CWTOT
3600       LDA CWTOT
3610       CLC
3620       ADC CWSPC
3630       STA CWSPC
3640       LDA #0
3650       STA CWTOT
3660       STA CWTOT+1
3670       STA CTAVG
3680       RTS
3690 ;
3700 ;ROM DATA
3710 COPYR
3720       .BYTE "  Codewriter III      BY
STEVE STUNTZ "
3730 MRX .WORD MEMRX1
3740 CWCHA
3750       .BYTE 0,0,0,0,0,0,0,0
3760       .BYTE 0,0,0,0,0,0,0,0
3770       .BYTE 0,0,0,0,0,0,0,0
3780       .BYTE 0,0,0,0,0,0,0,0
3790       .BYTE $FE,$00
3800       .BYTE $00,$00,$00,$00,$00,$00
3810       .BYTE $6D,$6D,$22,$2A,$73,$68
3820       .BYTE $6A,$29,$3F,$3E,$3C,$38
3830       .BYTE $30,$20,$21,$23,$27,$2F
3840       .BYTE $47,$55,$FF,$31,$FF,$4C
3850       .BYTE $00,$06,$11,$15,$09,$02
3860       .BYTE $14,$0B,$10,$04,$1E,$0D
3870       .BYTE $12,$07,$05,$0F,$16,$1B
3880       .BYTE $0A,$08,$03,$0C,$18,$0E
3890       .BYTE $19,$1D,$13
3900       *=   CWCHA+$0100
3910 ;
3920 PND =    *          ; END OF BOOT FILE
3930 ;*=$1000
3940 COPYI *= *+1
3950 ROW *=   *+1
3960 COL *=   *+1
3970 MEMRX1 = *
3980       *=   *+$0100
3990 POINTRI *= *+1
4000 POINTRO *= *+1
4010 CWMAX *= *+1
4020 CWSPC *= *+1
4030 CWAVG *= *+1
4040 PREVHILO *= *+1
4050 HILO *= *+1
4060 NBITS *= *+1
4070 RXCW *= *+1
4080 IAMREDI *= *+1
4090 CTAVG *= *+1
4100 CWTOT *= *+2
4110 I23X37 *= *+1
4120 RXINDX *= *+1
4122       *=   $02E0
4124       .WORD START
4130       .END
```

how to use the XE's extra 64K

130XE MEMORY MANAGEMENT

Article on page 28

LISTING 1

Don't type the TYPO II Codes!

```
AT 2 REM 130XE MEMORY MANAGEMENT
AI 4 REM BY IAN CHADWICK
FG 6 REM (c) 1985, ANTIC PUBLISHING
ZC 10 ? "K"
QU 15 PRINT "130XE EXTENDED BANK DEMONSTR
   ATION"
GY 16 PRINT "BY IAN CHADWICK":PRINT
GE 20 POKE 54017,253:REM DEFAULT VALUE
NZ 30 START=16384:REM FIRST BYTE OF ACCES
   S WINDOW
RE 40 LOOP=0:GOSUB 5000
TI 50 DL=PEEK(560)+PEEK(561)*256:REM STAR
   T OF DISPLAY LIST
TJ 60 SC1=PEEK(DL+4):SC2=PEEK(DL+5):REM S
   TART OF SCREEN RAM
DK 70 SC3=PEEK(88):SC4=PEEK(89):REM SCREE
   N POINTERS IN RAM
HQ 130 ? "PRESS A CONSOLE KEY"
ML 135 POKE 53279,8:REM CLEAR CONSOLE KEY
   S
ZW 140 IF PEEK(53279)=7 THEN 140:REM TEST
    FOR CONSOLE KEY
XR 145 POKE 106,128:REM LOWER RAMTOP
AD 150 IF PEEK(53279)=6 THEN GOSUB 1000:R
   EM START
PU 160 IF PEEK(53279)=5 THEN GOSUB 2000:R
   EM SELECT
```

continued on next page

```
EO 165 IF PEEK(53279)=2 THEN GOSUB 2500:R
   EM START & OPTION
GE 170 IF PEEK(53279)=3 THEN GOSUB 3000:R
   EM OPTION
DK 180 IF PEEK(53279)=4 THEN GOSUB 4000:R
   EM START & SELECT
YS 185 IF PEEK(53279)=0 THEN GOSUB 4500:R
   EM ALL THREE
NQ 190 GOTO 140
QG 999 REM START PRESSED: SHOW EXTENDED B
   ANK 0
HZ 1000 POKE DL+4,0:POKE DL+5,64
MS 1010 POKE 88,0:POKE 89,64
XC 1020 POKE 54017,209
AI 1030 RETURN
EF 1999 REM SELECT PRESSED: SHOW EXTENDED
    BANK 1
IA 2000 POKE DL+4,0:POKE DL+5,64
MT 2010 POKE 88,0:POKE 89,64
TL 2020 POKE 54017,213
AJ 2030 RETURN
FV 2499 REM OPTION & START PRESSED: SHOW
   MAIN BANK 1
IK 2500 POKE DL+4,0:POKE DL+5,64
ND 2510 POKE 88,0:POKE 89,64
WP 2520 POKE 54017,253
AT 2530 RETURN
RU 2999 REM OPTION PRESSED: SHOW EXTENDED
    BANK 2
IB 3000 POKE DL+4,0:POKE DL+5,64
MU 3010 POKE 88,0:POKE 89,64
WK 3020 POKE 54017,217
AK 3030 RETURN
TT 3999 REM START & SELECT PRESSED: SHOW
   EXTENDED BANK 3
IC 4000 POKE DL+4,0:POKE DL+5,64
MV 4010 POKE 88,0:POKE 89,64
ST 4020 POKE 54017,221
AL 4030 RETURN
RN 4499 REM ALL THREE PRESSED: RESTORE RA
   MTOP AND SHOW ORIGINAL SCREEN AREA
XM 4500 POKE 106,160:POKE DL+4,SC1:POKE D
   L+5,SC2
TD 4510 POKE 88,SC3:POKE 89,SC4
WR 4520 POKE 54017,253
AV 4530 RETURN
CT 4999 REM FILL A SCREEN EQUIVALENT WITH
    A VALUE
WD 5000 FOR LOOP=0 TO 3
RQ 5005 ? "FILLING EXTENDED BANK ";LOOP
DA 5010 POKE 54017,225+LOOP*4
LD 5020 GOSUB 6000:IF LOOP>3 THEN 5040
VK 5030 NEXT LOOP
CL 5035 GOSUB 6500
AP 5040 RETURN
KR 6000 FOR N=START TO START+993
VP 6010 POKE N,17+LOOP-1:NEXT N
AK 6020 RETURN
TQ 6499 REM MAIN BANK FILL
ES 6500 POKE 54017,253:? "FILLING MAIN BA
   NK      1"
LV 6505 FOR N=START TO START+993
TA 6510 POKE N,20:NEXT N
CJ 6515 POKE 106,128
AU 6520 RETURN
```

TYPO II DOUBLE FEATURE

Article on page 26

LISTING 1

Don't type the TYPO II Codes!

```
QQ 32000 REM SUPER TYPOII
UD 32010 REM BY BARTON, DELL'ERA, MCLAUGH
   LIN & SOLOMON
UK 32015 REM (c) 1985, ANTIC PUBLISHING
AQ 32020 CLR :DIM LINE$(120),B$(75):CLOSE
    #2:CLOSE #3
ZN 32025 B$="[illegible]"
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? " TYPO II "

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
FG 32065 IF LINE$="ERASE" THEN 32250
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
MY 32075 IF LINE$(1,1)="+" THEN POSITION
   2,5:? " ":GOTO 32230
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
PX 32150 ANS=USR(ADR(B$),ADR(LINE$),LEN(L
   INE$)):ANS=PEEK(1789)+256*PEEK(1790)+6
   5536*PEEK(1791)
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
FY 32210 POSITION 0,16:? CHR$(HCODE+128);
   CHR$(LCODE+128)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
LD 32230 B=B+1:POSITION 2,4:LIST B:POSITI
   ON 2,5:INPUT #3,LINE$:IF LINE$="" THEN
    32230
CW 32240 GOTO 32080
YE 32250 ? "↖":? :FOR ZZ=32000 TO 32140 S
   TEP 10:? ZZ:NEXT ZZ:? 32015:? 32025
NK 32260 ? "CLR:POKE 842,12:CONT";:POSITI
   ON 2,0:POKE 842,13:STOP
LH 32270 ? "↖":? :FOR ZZ=32150 TO 32280 S
   TEP 10:? ZZ:NEXT ZZ:? 32065:? 32075
```

```
PU 32280 ? "CLR:POKE 842,12:CONT";:POSITI
   ON 2,0:POKE 842,13:END
```

LISTING 2

```
SM 10 REM TYPO II CODE GENERATOR
PY 20 REM BY ANDY BARTON
XO 30 REM (C) 1985, ANTIC MAGAZINE
QW 50 CLR :DIM LINE$(120),OUT$(128),FILE$
   (15),X$(19),A$(17)
YP 55 DIM B$(75):B$="ЭЬЂKhhЂKhЂLhhЂOЭ♥▬K/
   ▬K/▬D/█♥ZKЂPILЂN┴ZNmK/▬K/E"nK/▬K/P┘nD/
   FPPfHfKFOPK◆"
OM 60 ? "↖":? :? "TYPOII CODE GENERATOR"
NQ 80 ? :? "Choose a file: [Dn:filename O
   R C:] ":? :? :INPUT FILE$
CZ 90 TRAP 380:CLOSE #2:OPEN #2,4,0,FILE$
RV 100 TRAP 360:INPUT #2;LINE$
SF 110 A=ASC(LINE$(1,1)):IF A<48 OR A>57
   THEN 360
UJ 120 TRAP 40000:? :? "CHOOSE OUTPUT DEV
   ICE:":? "Screen   Printer   Disk   Cas
   sette":? :? :? "          ";:INPUT OUT$
UF 130 IF OUT$="S" THEN OUT$="E":GOTO 190
VJ 140 IF OUT$="D" THEN ? :? "GIVE [Dn:fi
   le name] ";:INPUT OUT$:IF OUT$<>"" THE
   N 170
CC 150 IF OUT$<>"P" AND OUT$<>"C" THEN 12
   0
PN 160 GOTO 190
MG 170 FOR X=1 TO LEN(OUT$):IF OUT$(X,X)=
   "." THEN 190
OZ 180 NEXT X:OUT$(LEN(OUT$)+1)=".TYP"
MM 190 TRAP 450:CLOSE #3:OPEN #3,8,0,OUT$
   :TRAP 40000:IF OUT$="C" THEN OUT$=" ":
   OUT$(128)=" ":OUT$(2)=OUT$:? #3;OUT$
MN 200 GOTO 220
PZ 210 TRAP 340:INPUT #2;LINE$:TRAP 40000
JT 220 IF LINE$(LEN(LINE$))=" " THEN LINE
   $=LINE$(1,LEN(LINE$)-1)
YB 230 C=0:ANS=C:ANS=USR(ADR(B$),ADR(LINE
   $),LEN(LINE$)):ANS=PEEK(1789)+256*PEEK
   (1790)+65536*PEEK(1791)
WB 240 CODE=INT(ANS/676)
CS 250 CODE=ANS-(CODE*676)
YL 260 HCODE=INT(CODE/26)
XF 270 LCODE=CODE-(HCODE*26)+65
VI 280 HCODE=HCODE+65
NS 290 OUT$=CHR$(HCODE):OUT$(2,2)=CHR$(LC
   ODE):OUT$(3,3)=" "
EP 300 FOR X=1 TO LEN(LINE$):IF LINE$(X,X
   )=" " THEN 320
LP 310 NEXT X
QD 320 OUT$(4)=LINE$(1,X-1)
EZ 330 ? #3;OUT$:GOTO 210
ZL 340 IF PEEK(195)<>136 THEN ? :? "ERROR
   -  ";PEEK(195):END
DZ 350 ? :? "^^^ FINISHED ^^^":END
UB 360 ? :? FILE$;" is not a BASIC progra
   m"
UZ 370 ? "in LIST format.":GOTO 390
UT 380 OUT$=FILE$:RT$=390:GOTO 460
WT 390 OUT$="D1:*.*":TRAP 400:IF FILE$(1,
   2)>"D1" AND FILE$(1,2)<"D5" THEN OUT$(
   2,2)=FILE$(2,2)
IY 400 TRAP 440:? :CLOSE #1:OPEN #1,6,0,O
   UT$:? :? OUT$(1,2);"  DIRECTORY":?
ZY 410 INPUT #1,A$:IF A$(5,8)="FREE" THEN
    ? :GOTO 80
ZI 420 X$=A$(3,11):X$(10)=A$(11,17):X$(17
   )="   ":IF A$(11,11)<>" " THEN X$(9,9)
   ="."
QE 430 ? X$;:GOTO 410
CJ 440 RT$=80:GOTO 460
TI 450 RT$=120
HY 460 ? :A=PEEK(195):IF A=130 THEN ? OUT
   $;" DOES NOT EXIST":? "TYPE  Dn:filena
   me":Z=1
SF 470 IF A=138 THEN ? OUT$;" DOES NOT RE
   SPOND":Z=1
BE 480 IF A=160 THEN ? "DRIVE NUMBER ERRO
   R":Z=1
SX 490 IF A=162 THEN ? "THIS DISK IS FULL
   .  USE ANOTHER ONE":Z=1
KG 500 IF A=165 THEN ? OUT$;" IS AN INVAL
   ID FILE NAME":Z=1
WY 510 IF A=167 THEN ? OUT$;" IS LOCKED":
   Z=1
ZT 520 IF A=169 THEN ? "THE DISK DIRECTOR
   Y IF FULL.         USE ANOTHER DISKE
   TTE":Z=1
AH 530 IF A=170 THEN ? "FILE NOT FOUND":Z
   =1
ZK 540 IF Z<>1 THEN ? "ERROR-   ";A
YP 550 Z=0:? :GOTO RT$
```

now . . . universal picture file compatibility

RAPID GRAPHICS CONVERTER

Article on page 33

LISTING 1

Don't type the TYPO II Codes!

```
SR 10 REM RAPID GRAPHICS CONVERTER, LISTI
   NG 1
KZ 20 REM BY CHARLES JACKSON
FW 30 REM (c) 1985, ANTIC PUBLISHING
LA 40 POKE 65,0:BRK=1:IF PEEK(53279)=5 TH
   EN BRK=0
TX 50 GOTO 80
RX 60 POKE 752,1:IF BRK THEN POKE 16,112:
   POKE 53774,112
ZX 70 RETURN
SZ 80 GRAPHICS 2:GOSUB 60:POKE 752,1:POKE
    710,112:POKE 712,112:POKE 708,28:POKE
    709,12
ZN 90 POSITION 5,2:? #6;"RAPID":FOR X=1 T
   O 250:NEXT X
BK 92 POSITION 5,4:? #6;"GRAPHICS":FOR X=
   1 TO 250:NEXT X
UZ 94 POSITION 5,6:? #6;"CONVERTER":FOR X
   =1 TO 250:NEXT X
```

continued on next page

```
LR 100 ? :? "          By Charles Jackson":
   FOR X=1 TO 250:NEXT X
CG 105 ? :? "      (c) 1985, Antic Publishi
   ng";:GOSUB 60
JG 110 DIM IN$(15),OUT$(15),MP$(7684),MI$
   (7960),A$(5)
ZJ 120 MI$(1)="♥":MI$(7960)=MI$:MI$(2)=MI
   $:MP$=MI$:IO=848:A$="♥♥♥♥♥":MAX=10
TO 130 AD=ADR(MP$):ADHI=INT(AD/256):ADLO=
   AD-ADHI*256
OA 140 FOR X=1 TO 500:NEXT X:FLG=0
IX 150 TRAP 150:GRAPHICS 0:POKE 710,26:PO
   KE 709,2:GOSUB 580:? :? "Type of SOURC
   E file";:INPUT SRC
SS 160 SETCOLOR 2,SRC,10:FLG=SRC=5
FN 170 IF SRC=0 THEN GOSUB 440:GOTO 150
VF 180 IF SRC>MAX OR SRC<0 THEN 150
NQ 190 ? :? "Filename";:INPUT IN$:GOSUB 6
   0
HF 200 IF LEN(IN$)<2 THEN GOSUB 440:GOTO
   190
BG 210 TRAP 210:GOSUB 580:POKE 710,102:PO
   KE 709,0:? :? "Type of DESTINATION fil
   e";:INPUT DEST
IO 220 SETCOLOR 2,DEST,10:GOSUB 60:FLG=DE
   ST=5
RB 230 IF DEST=0 THEN GOSUB 440:GOTO 210
KJ 240 IF DEST>MAX OR DEST<0 THEN 210
II 250 ? :? "Filename";:INPUT OUT$
OZ 260 IF LEN(OUT$)<2 THEN GOSUB 440:GOTO
    250
FM 270 IF  NOT (DEST=7 AND OUT$(LEN(OUT$)
   -3,LEN(OUT$))<>".BKG") THEN 290
TD 280 ? :? "Needs .BKG extender!!!":FOR
   X=1 TO 150:NEXT X:GOTO 250
NG 290 IF  NOT ((DEST=4 OR DEST=5) AND OU
   T$(LEN(OUT$)-3,LEN(OUT$))<>".PIC") THE
   N 310
XS 300 ? :? "Needs .PIC extender!!!":FOR
   X=1 TO 150:NEXT X:GOTO 250
AU 310 IF  NOT (DEST=10 AND OUT$(LEN(OUT$
   )-3,LEN(OUT$))<>".SCR") THEN 330
HC 320 ? :? "Needs .SCR extender!!!":FOR
   X=1 TO 150:NEXT X:GOTO 250
NG 330 GRAPHICS 0:GOSUB 60:? :? "Insert s
   ource disk, press  START "
XR 340 IF PEEK(53279)<>6 THEN 340
JE 350 IF SRC=5 THEN POKE 4226,40:POKE 42
   29,2:REM RESTON
JZ 360 TRAP 150:CLOSE #1:OPEN #1,4,0,IN$:
   CLOSE #1:TRAP 40000
GL 370 ON SRC GOSUB 1040,830,1090,1860,18
   50,1300,1500,1040,1720,1040
ZF 380 IF SRC=10 THEN MP$(7681,7684)="♥◣5
   ▪"
YS 390 GRAPHICS 0:GOSUB 60:POKE 710,66:PO
   KE 709,12:? :? :? :? "Insert destinati
   on disk, press  START "
UA 400 IF PEEK(53279)<>6 THEN 400
PY 410 FOR X=14 TO 0 STEP -1:POKE 712,X:N
   EXT X:GOSUB 60:TRAP 40000
HJ 420 ON DEST GOSUB 790,630,1200,2000,19
   90,1310,1600,1690,1770,2110
UU 430 RUN
TT 440 ? "↖                  Directory ":?
YO 450 REM DISK DIRECTORY
TN 455 IF FLG THEN POKE 4226,40:POKE 4229
   ,2:REM RESTON
TZ 460 CLOSE #1:OPEN #1,6,0,"D:*.*":FL=0
RS 470 INPUT #1,IN$
RT 480 IF IN$(2,2)<>" " THEN 520
VA 490 ? "      ";IN$(2,13);
FR 500 IF FL THEN ?
HM 510 FL= NOT FL:GOTO 470
AX 520 ? :? :?
LH 530 CLOSE #1
VK 540 POKE 764,255:? :? :? "Press any ke
   y":? "or RETURN for another directory"
TS 550 OPEN #1,4,0,"K:":GET #1,FL:CLOSE #
   1
HP 560 IF FL=155 THEN 440
MD 570 POKE 764,255:POKE 4226,105:POKE 42
   29,1:RETURN
WJ 580 GOSUB 60:? "↖"," (1) Micropainter"
   :? ,"(2) Micro Illustrator/Koala"
UM 590 ? ,"(3) Fun With Art":? ,"(4) Pain
   t (Atari)"
FY 600 ? ,"(5) Paint (Reston)":? ,"(6) Vi
   sualizer"
PR 610 ? ,"(7) Moviemaker":? ,"(8) Graphi
   cs Master":? ,"(9) Atarigraphics":? ,"
   ←(10) Graphics Machine"
ZG 620 RETURN
FU 630 MI$="[illegible]"
VZ 640 REM MP TO MI COMPRESSED
MC 650 IF MP$(7681,7684)="♥♥♥♥" THEN MP$(
   7681,7684)="♥◣5▪"
WV 660 MI$(18,18)=MP$(7681,7681):MI$(14,1
   6)=MP$(7682,7684):MI$(17,17)=""
RS 670 MI$(19,20)="W←"
YD 680 RESTORE 700:FOR X=21 TO 28:READ A
MG 690 MI$(X,X)=CHR$(A):NEXT X
KU 700 DATA 0,0,155,155,155,155,162,255
VQ 710 FOR COUNT=1 TO 60
FZ 720 A=COUNT*128-99:B=COUNT*127-126
KP 730 MI$(A,A+126)=MP$(B,B+126):MI$(A+12
   7,A+127)=CHR$(255)
EU 740 NEXT COUNT
AK 750 MI$(7708,7708)=CHR$(188)
EQ 760 MI$(7709)=MP$(7621,7680)
KJ 770 OPEN #1,8,0,OUT$:? #1;MI$;
HT 780 CLOSE #1:RETURN
IT 790 CLOSE #1:OPEN #1,8,0,OUT$
EE 800 REM KEEP AN MP FILE
OY 810 ? #1;MP$;:CLOSE #1
ZI 820 RETURN
TQ 830 DIM MAIN$(342)
CG 840 REM LOAD AN MI PICTURE
ZV 850 RESTORE 890
PE 860 FOR A=1536 TO 1556
DM 870 READ B:POKE A,B
DM 880 NEXT A
HL 890 DATA 162,16,169,1,157,72,3,169,0,1
   57,73,3,32,86,228,48,1,96,104,104,96
ON 900 MAIN$="[illegible]"
FI 910 MAIN$(55)="[illegible]"
EH 920 MAIN$(115)="[illegible]"
ES 930 MAIN$(175)="[illegible]"
UU 940 MAIN$(228)=CHR$(155)
TY 950 MAIN$(229)="[illegible]"
OS 960 MAIN$(291)="[illegible]"
US 970 POKE 88,ADLO:POKE 89,ADHI
OB 980 OPEN #1,4,0,IN$:POKE 559,0
OJ 990 A=USR(ADR(MAIN$))
GN 1000 MP$(7681,7681)=CHR$(PEEK(712))
PZ 1010 FOR X=0 TO 2:MP$(X+7682,X+7682)=C
   HR$(PEEK(708+X)):NEXT X
YH 1020 CLOSE #1:GRAPHICS 0:POKE 559,34
OE 1030 GOSUB 60:RETURN
NV 1040 CLOSE #1:OPEN #1,4,0,IN$
LT 1050 REM GET A MP/GM FILE
OE 1060 POKE IO+2,7:POKE IO+4,ADLO:POKE I
   O+5,ADHI:POKE IO+8,4:POKE IO+9,30
NF 1070 JNK=USR(ADR("hhh[illegible]LV[illegible]"),16):CLOSE
   #1
AX 1080 RETURN
ZN 1090 IO=848:OPEN #1,4,0,IN$
QR 1100 REM FWA to MP
BW 1110 AD=ADR(MI$):ADHI=INT(AD/256):ADLO
```

```
   =AD-ADHI*256
JK 1120 POKE IO+2,7:POKE IO+4,ADLO:POKE I
   O+5,ADHI
GG 1130 POKE IO+8,24:POKE IO+9,31
TI 1140 N=USR(ADR("hhh█LV█"),16)
NA 1150 CLOSE #1
YG 1160 MP$(1,4080)=MI$(263,4342)
AK 1170 MP$(4081,7680)=MI$(4359,7958)
CK 1180 MP$(7681,7684)=MI$(3,6)
BC 1190 RETURN
GC 1200 MI$="♥":MI$(1)="♥":MI$(7960)=MI$:
   MI$(2)=MI$
OQ 1210 REM MP to FWA
KD 1220 MI$(1,65)="█K█♥y5▪PPPN♥P__________
   ______________________________________
   _____"
DH 1230 MI$(66,132)="_____________________
   ________________________________N♥♦_______
   __________"
HQ 1240 MI$(133,200)="____________________
   ______________________________________
   _____________"
GE 1250 MI$(201,262)="_____A♥/h█h▬┝ █G█┘█┝
   ▐▬♥ █h█he█♥▬♥ █♥▬┝ █G▬_█L_█♥♥♥♥♥♥♥♥♥♥♥
   ♥♥♥♥♥"
AU 1260 MI$(263,4342)=MP$(1,4080)
VH 1270 MI$(4359,7958)=MP$(4081,7680)
NC 1280 MI$(7959,7960)="♥♥"
HU 1290 MI$(3,6)=MP$(7681,7684)
GP 1300 OPEN #1,8,0,OUT$:? #1;MI$(1,7960)
   ;:CLOSE #1:RETURN
UQ 1310 REM MP TO VIS
TN 1320 MI$="♥"
HN 1330 MI$(1,3)=MP$(7682,7684):MI$(4,4)=
   "♥":MI$(5,5)=MP$(7681,7681)
ZY 1340 CNT=7
JM 1350 FOR I=1 TO 166 STEP 2
ZA 1360 MI$(CNT,CNT+39)=MP$(I*40-39,I*40)
   :CNT=CNT+40:NEXT I
XC 1370 OPEN #1,8,0,OUT$:? #1;MI$(1,3326)
   ;:CLOSE #1:RETURN
OP 1380 REM VIS TO MP
CY 1390 AD=ADR(MI$):ADHI=INT(AD/256):ADLO
   =AD-ADHI*256
PQ 1400 OPEN #1,4,0,IN$
YK 1410 POKE IO+2,7:POKE IO+4,ADLO:POKE I
   O+5,ADHI:POKE IO+8,254:POKE IO+9,12
AS 1420 U=USR(ADR("hhh█LV█"),16):CLOSE #1

ZX 1430 CNT=7
TW 1440 MP$(7682,7684)=MI$(1,3):MP$(7681,
   7681)=MI$(4,4)
GU 1450 FOR I=0 TO 190 STEP 2
WQ 1460 MP$(I*40+1,I*40+40)=MI$(CNT,CNT+3
   9)
IY 1470 MP$(I*40+41,I*40+80)=MI$(CNT,CNT+
   39)
LB 1480 CNT=CNT+40:NEXT I
BI 1490 RETURN
MZ 1500 REM MM TO MP
CE 1510 AD=ADR(MI$):ADHI=INT(AD/256):ADLO
   =AD-ADHI*256
NZ 1520 CLOSE #1:OPEN #1,4,0,IN$
MT 1530 POKE IO+2,7:POKE IO+4,ADLO:POKE I
   O+5,ADHI:POKE IO+8,16:POKE IO+9,15
NG 1540 JNK=USR(ADR("hhh█LV█"),16):CLOSE
   #1
TW 1550 FOR X=1 TO 3840 STEP 40
YY 1560 NN=2*X-1:MP$(NN,NN+39)=MI$(X,X+39
   ):MP$(NN+40,NN+79)=MI$(X,X+39)
MD 1570 NEXT X
PO 1580 MP$(7681,7684)=MI$(3841,3844)
BK 1590 RETURN
MJ 1600 REM MP TO MM
LO 1610 MI$(1)="♥":MI$(3856)=MI$:MI$(2)=M
   I$
NW 1620 FOR X=41 TO 7680 STEP 160
CB 1630 NN=X/2-19.5
XD 1640 MI$(NN,NN+79)=MP$(X,X+79)
LZ 1650 NEXT X
AJ 1660 MI$(3841,3844)=MP$(7681,7684)
VH 1670 OPEN #1,8,0,OUT$:? #1;MI$(1,3856)
   ;:CLOSE #1
BJ 1680 RETURN
JS 1690 REM MP TO GM
WH 1700 CLOSE #1:OPEN #1,8,0,OUT$
RE 1710 ? #1;MP$;"♥";:CLOSE #1:RETURN
GF 1720 REM AG TO MP
ZK 1730 GOSUB 1040
KC 1740 MI$=" ":MI$(1,1)=MP$(7684,7684):M
   I$(2,4)=MP$(7681,7683)
GI 1750 MP$(7681,7684)=MI$
BF 1760 RETURN
BY 1770 REM MP TO AG
IM 1780 MI$=" ":MI$(4,4)=MP$(7681,7681):M
   I$(1,3)=MP$(7682,7684)
GU 1790 MP$(7681,7684)=MI$
WJ 1800 CLOSE #1:OPEN #1,8,0,OUT$
KG 1810 ? #1;MP$;
VO 1820 MP$(1)="♥":MP$(7684)=MP$:MP$(2)=M
   P$
GM 1830 ? #1;MP$;MP$(1,504);:CLOSE #1
BB 1840 RETURN
AJ 1850 POKE 4226,40:POKE 4229,2:REM REST
   ON
QF 1860 REM PAINT TO MP
DC 1870 AD=ADR(MI$):ADHI=INT(AD/256):ADLO
   =AD-ADHI*256
OX 1880 CLOSE #1:OPEN #1,4,0,IN$
VD 1890 POKE IO+2,7:POKE IO+4,ADLO:POKE I
   O+5,ADHI:POKE IO+8,144:POKE IO+9,12
NC 1900 JNK=USR(ADR("hhh█LV█"),16):CLOSE
   #1
AU 1910 A$=MI$(1,4)
FJ 1920 MP$(1,3200)=MI$(17,3216):MI$="♥":
   MI$=MP$(1,3200)
MW 1930 FOR X=1 TO 3200 STEP 40
ZA 1940 NN=2*X-1:MP$(NN,NN+39)=MI$(X,X+39
   ):MP$(NN+40,NN+79)=MI$(X,X+39)
MF 1950 NEXT X
VG 1960 MP$(7681,7684)=A$(1,4)
AQ 1970 POKE 4226,105:POKE 4229,1
BP 1980 RETURN
AX 1990 POKE 4226,40:POKE 4229,2:REM REST
   ON
WC 2000 REM MP TO PAINT
CN 2010 MI$(1)="♥":MI$(3216)=MI$:MI$(2)=M
   I$
KQ 2020 A$=MP$(7681,7684)
KT 2030 FOR X=41 TO 6281 STEP 160
BT 2040 NN=X/2-19.5
WV 2050 MI$(NN,NN+79)=MP$(X,X+79)
LR 2060 NEXT X
XK 2070 MP$=MI$:MI$=A$:MI$(6,16)="e1(D(3(
   P0nH":MI$(17)=MP$
HJ 2080 OPEN #1,8,0,OUT$:? #1;MI$(1,3216)
   ;:CLOSE #1
AF 2090 POKE 4226,105:POKE 4229,1
AC 2100 RETURN
VZ 2110 CLOSE #1:OPEN #1,8,0,OUT$
QP 2120 ? #1;MP$(1,7680);:CLOSE #1:RETURN
```

LISTING 2

```
UH 10 REM RAPID GRAPHICS CONVERTER, LISTI
   NG 2
KZ 20 REM BY CHARLES JACKSON
FW 30 REM (c) 1985, ANTIC PUBLISHING
QV 40 DIM TEMP$(20),AR$(93)
UK 45 GRAPHICS 0:POKE 710,230:POKE 709,12
   :POKE 712,148
HA 50 ? :? "Creating lines:":? :? "630, 9
   00-960 and 1220-1250"
SC 60 ? :? "for CONVERT.BAS"
MS 90 TRAP 160
```

continued on next page

```
PX 100 ? :? :? "Working...please stand by
   "
LO 110 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BI 120 AR$="":READ AR$
XU 130 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DE 140 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")        "
SU 150 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 120
HK 160 POKE 710,148:POKE 712,230
TP 165 ? :? :? "Press [START] to write t
   hese lines":? "to a disk file named D:
   LINES.LST"
ZA 170 IF PEEK(53279)<>6 THEN 170
LW 175 ? :? "(Writing LINES.LST)";
SN 180 OPEN #1,8,0,"D:LINES.LST"
EC 190 ? #1;A$;:CLOSE #1
RU 220 GRAPHICS 0:? " COMPLETED "
JT 1000 DATA 834
MB 1010 DATA 0540510480320770730360610342
   551282011990260000010020140000040000192
   034155057048048032077065073
KN 1020 DATA 0780360610341041620161690071
   570660031692321570680031690001570690003
   169001157072003169000157073
AU 1030 DATA 003169000133224032000000061652
   242010072400132010132400162010262400060
   230224024144234034155057049
EM 1040 DATA 0480320770650730780360400530
   53041061034165232133234024144244165232
   141196002230224032000006165
ZX 1050 DATA 2321411970022302240320000061
   65232141198002230224032000006165232141
   199002230224032000006165232
MQ 1060 DATA 1412000020241441961690001332
   36133034155057050048032077065073078036
   040049049053041061034230165
PY 1070 DATA 0881332241332281650891332251
   33229032000006192136240094169000133227
   165232041128133235165232041
SH 1080 DATA 1271332262080140320000061652
   32133227032000006165232133226198226165
   235208028032000034155057051
LP 1090 DATA 0480320770650730780360400490
   55053041061034006165232133233024144047
   198226169255197226208245198
AM 1100 DATA 2271692551972272082372401830
   32000006165232133233024144019198226169
   255197226208238198227169255
OU 1110 DATA 1972272082302400341550570520
   48032077065073078036040050050056041061
   067072082036040049053053041
VW 1120 DATA 1550570530480320770650730780
   36040050050057041061034096169002197234
   240082240201165233160000145
AL 1130 DATA 2240241690801012241332241690
   00101225133225230230169096197230208047
   169001197236208024024169001
YZ 1140 DATA 1012281332281332241690001332
   36133230101229133229133034155057054048
   032077065073078036040050057
YO 1150 DATA 0490410610342250241440172302
   36024169040101228133224169000133230101
   229133225165235240176208149
VA 1160 DATA 1652331600001452240241690011
   01224133224169000101225133225165235240
   151208229034155049050050048
AV 1170 DATA 0320770730360400490440540530
   41061034254254000121053015112112112078
   000080014014014014014014014
GO 1180 DATA 0140140140140140140140140140
   14014014014014014014014014014014014014
   014014014014014014014014014
KE 1190 DATA 0140140140140140140140140140
   140140140140140340155049050051048032
   077073036040054054044049051
II 1200 DATA 0500410610340140140140140140
   14014014014014014014014014014014014014
   014014014014014014014014014
YX 1210 DATA 0140140140140140140140140140
   14014014014014014014014014014014014078
   000096014014014014014014014
JH 1220 DATA 0140140140140140140140140140
   34155049050052048032077073036040049051
   051044050048048041061034014
GB 1230 DATA 0140140140140140140140140140
   14014014014014014014014014014014014014
   014014014014014014014014014
GE 1240 DATA 0140140140140140140140140140
   14014014014014014014014014014014014014
   014014014014014014014014014
NL 1250 DATA 0140140140140341550490500
   53048032077073036040050048049044050054
   050041061034014014014014014
SI 1260 DATA 0650000061041701041410010022
   32208003238001002142000002104170104064
   169000141000002169000141001
KQ 1270 DATA 0021691921410142120760952280
   00000000000000000000000000000000000000
   000000000000000034155
```

assembly language

FAST MOVES

Article on page 70

LISTING 1

Don't type the TYPO II Codes!

```
LT 10 REM FASTMOVES, LISTING 1
QB 20 REM BY PATRICK DELL'ERA
FW 30 REM (c) 1985, ANTIC PUBLISHING
BE 70 REM
OD 80 CURSOR=752:OFF=1:KOLOR0=708:KOLOR2=
   710:KOLOR4=712:WINDOWSIZE=703
QJ 90 GRAPHICS 0:POKE CURSOR,OFF
MH 100 DISPLAYLIST=PEEK(560)+PEEK(561)*25
   6:POKE DISPLAYLIST+7,7:POKE DISPLAYLIS
   T+8,12
GL 110 POKE KOLOR0,154:POKE KOLOR2,146:PO
   KE KOLOR4,144
OQ 120 POSITION 4,2:? "FAST MOVES"
OD 130 POSITION 2,5:? "This program creat
   es an AUTORUN.SYS"
UP 140 ? "↓file that, when booted, will"
IM 150 ? "↓let the cursor control keys mo
   ve"
BZ 160 ? "↓the cursor much faster than th
   e"
YB 170 ? "↓standard Operating System does
   ."
TG 180 POKE WINDOWSIZE,4
QA 190 ? "Put a formatted DOS 2 or 2.5 d
   isk"
HL 200 ? "into drive #1."
MQ 210 ? "Press START when you are ready.
   .."
```

```
UH 220 GOSUB 360
IY 230 TRAP 270:OPEN #1,4,0,"D:AUTORUN.SY
   S":CLOSE #1:POKE 710,66
RB 240 ? "{CLEAR}{UP}This disk already has an AUTO
   RUN.SYS"
XG 250 ? "file.  Press START if you want
   to"
YO 260 ? "write over it.";:GOSUB 360:POKE
    710,146
UK 270 ? "{UP}{DOWN}{RIGHT}Writing Fast Moves...";
OO 280 CLOSE #1:OPEN #1,8,0,"D:AUTORUN.SY
   S"
CT 290 RESTORE
ER 300 FOR X=1 TO 249:READ A:POKE 708,A:S
   OUND 0,A,8,8:PUT #1,A:NEXT X
LB 310 CLOSE #1
TJ 320 ? "{UP}{DOWN}{RIGHT}The deed is done!"
KR 330 FOR X=1 TO 500:NEXT X
NC 340 N=USR(58487)
OC 350 END
AB 360 IF PEEK(53279)<>6 THEN 360
ZN 370 RETURN
YJ 380 DATA 255,255,124,29,104,30,1,255
GZ 390 DATA 142,143,134,135,138,72,173,9
DU 400 DATA 210,162,4,202,142,125,29,48
OW 410 DATA 22,221,126,29,208,245,141,242
GX 420 DATA 2,141,252,2,169,15,141,124
QW 430 DATA 29,133,77,104,170,104,64,104
NS 440 DATA 170,76,255,255,32,255,255,169
FI 450 DATA 170,133,12,169,29,133,13,169
CY 460 DATA 218,133,10,169,29,133,11,169
RX 470 DATA 40,141,231,2,169,30,141,232
TW 480 DATA 2,169,130,141,8,2,169,29
JV 490 DATA 141,9,2,169,7,162,30,160
NJ 500 DATA 2,76,92,228,169,255,141,8
LM 510 DATA 2,169,255,141,9,2,169,7
AT 520 DATA 174,39,30,172,38,30,32,92
YQ 530 DATA 228,169,255,133,12,169,255,13
   3
XI 540 DATA 13,169,255,133,10,169,255,133
CJ 550 DATA 11,76,255,255,173,124,29,240
HR 560 DATA 5,206,124,29,208,25,173,125
BR 570 DATA 29,48,20,173,15,210,41,4
DA 580 DATA 208,13,169,6,205,43,2,176
OI 590 DATA 3,141,43,2,206,43,2,76
KP 600 DATA 255,255,165,10,141,0,30,141
YE 610 DATA 248,29,165,11,141,1,30,141
UT 620 DATA 252,29,165,12,141,171,29,141
VM 630 DATA 240,29,165,13,141,172,29,141
KG 640 DATA 244,29,173,8,2,141,168,29
XT 650 DATA 141,219,29,173,9,2,141,169
LI 660 DATA 29,141,224,29,173,36,2,141
IK 670 DATA 38,30,173,37,2,141,39,30
FG 680 DATA 76,173,29,224,2,225,2,40
IQ 690 DATA 30
```

LISTING 2

```
10 ; FAST MOVES, LISTING 2
20 ; BY PATRICK DELL'ERA
30 ; (c) 1985, ANTIC PUBLISHING
40 ;
0100 ; EQUATES
0110 ;
0120 RUNAD = $02E0      ;Auto run addr
0130 MEMLO = $02E7      ;Lower limit of
0140 ;                  ; free memory
0150 DOSVEC = $0A       ;Addr jumped to
0160 ;                  ; when DOS called
0170 DOSINI = $0C       ;Initialization
0180 ;                  ; addr for DOS
0190 VVBLKD = $0224     ;dlyd vbi vctr
0200 SETVBV = $E45C     ;set vbi
0210 VKEYBD = $0208     ;Keyboard vctr
0220 SKSTAT = $D20F   ;Keyboard status
0230 KBCODE = $D209   ;Pokey rgstr
0240 CH   =   $02FC   ;Current key--
0250 ;                ; KBCODE shadow
0260 CH1 =   $02F2    ;Previous key
0270 ATTRACT = $4D    ;Atct mode flag
0280 SRTIMR = $022B   ;Auto-Repeat tmr
0290 UP   =   $8E     ;Hardware codes
0300 DOWN =   $8F     ; for key
0310 LEFT =   $86     ; pressed
0320 RIGHT = $87      ;
0330 DUMMY = $FF      ;Variable byte
0340 ADDR =   $FFFF   ;Variable word
0350 ;
0380 ;
0390      *=  $1D7C   ;End of resident
0420 ;
0430 ;
0440 DBOUNCE .BYTE 1
0450 FASTFLG .BYTE $FF
0460 TABLE
0470      .BYTE UP,DOWN,LEFT,RIGHT
0480 FAST.MOVES
0490      TXA             ;OS has already
0500      PHA             ; saved reg A,
0510 ;                    ; we also save X
0520      LDA KBCODE      ;Get key pressed
0530      LDX #4          ;Then search
0540 ;                    ; TABLE for a
0550 ;                    ; match
0560 SEARCH
0570      DEX
0580      STX FASTFLG ;Save index into
0590 ;                ; TABLE
0600      BMI NONE    ;End of table...
0610      CMP TABLE,X ;Found a match?
0620      BNE SEARCH  ;No,keep looking
0630      STA CH1     ;Key is a cursor
0640      STA CH      ; control, so
0650      LDA #$0F    ; update current
0660      STA DBOUNCE ; and previous
0670      STA ATTRACT ; key pressed,
0680      PLA         ; set our delay
0690      TAX         ; timer, reset
0700      PLA         ; attract mode
0710      RTI         ; and go back
0720 NONE
0730      PLA         ;No matches so
0740      TAX         ; let OS have key
0750 VKEYBD.SAVE = *+1
0760      JMP ADDR    ;Addr is modi-
0770 ;                ; fied by INIT
0780 ;                ; to point to
0790 ;                ; OS's handler
0800 ;
0810 ;
0820 ;The addr for REINIT is stored
0830 ;in DOSINI.  SYSTEM RESET will
0840 ;come through here and then
0850 ;through INIT2 to re-establish
0860 ;Fast Moves.
0870 ;
0880 REINIT
0890      JSR ADDR    ;Address is
0900 ;                ; changed to
0910 ;                ; DOSINI vector
0920 ;                ; by INIT
0930 ;
0940 ;After returning from the
0950 ;DOS initialization, we have to
0960 ;re-establish the vectors in
0970 ;DOSINI, and DOSVEC. In this way
0980 ;we make Fast Moves "persistent".
0990 ;
1000 INIT2
1010      LDA # <REINIT
1020      STA DOSINI
1030      LDA # >REINIT
1040      STA DOSINI+1
1050      LDA # <CALL.DOS
```

continued on next page

```
1060       STA DOSVEC
1070       LDA # >CALL.DOS
1080       STA DOSVEC+1
1090 ;
1100 ;Move lo mem up to create safe
1110 ;place for Fast Moves.
1120 ;
1130       LDA # <FINIS
1140       STA MEMLO
1150       LDA # >FINIS
1160       STA MEMLO+1
1170 ;
1180 ;Insert Fast Moves into the
1190 ;keyboard service routines.
1200 ;
1210       LDA # <FAST.MOVES
1220       STA VKEYBD
1230       LDA # >FAST.MOVES
1240       STA VKEYBD+1
1250 ;
1260 ;Install our vertical blank
1270 ;routine the safe way, through
1280 ;the OS routine for setting
1290 ;vertical blank routines!
1300 ;
1310       LDA #7
1320       LDX # >VBLANK
1330       LDY # <VBLANK
1340       JMP SETVBV
1350 ;
1360 ;Any call to DOS will vector
1370 ;through here.
1380 ;
1390 CALL.DOS
1400 ;
1410 ;Fisrt, replace the OS keyboard
1420 ;routine.
1430 ;
1440       LDA #DUMMY    ;This value is
1450 ;                  ; is set by INIT
1460 VKEYBD.L = *-1
1470       STA VKEYBD
1480       LDA #DUMMY    ;So is this one!
1490 VKEYBD.H = *-1
1500       STA VKEYBD+1
1510 ;
1520 ;Then, re-establish the original
1530 ;vertical blank routine.
1540 ;
1550       LDA #7
1560       LDX VBLANK.1+2
1570       LDY VBLANK.1+1
1580       JSR SETVBV
1590 ;
1600 ;Then DOS initialization and
1601 ;start addresses.
1610 ;
1620 DOSREINI
1630 DOS1 =   *+1
1640       LDA #DUMMY    ;Dummy values
1650       STA DOSINI    ; are changed by
1660 DOS2 =   *+1
1670       LDA #DUMMY    ; INIT to
1680       STA DOSINI+1  ; restore
1685 DOS3 =   *+1
1690       LDA #DUMMY    ; DOSINI and
1700       STA DOSVEC    ; DOSVEC
1705 DOS4 =   *+1
1710       LDA #DUMMY    ;
1720       STA DOSVEC+1
1730 ;
1740 ;Now we can go safely to DOS.
1750 ;
1760 DO.DOS.V
1770       JMP ADDR      ;Addr changed by
1780 ;                  ; INIT to show
1790 ;                  ; DOSVEC
1800 ;
1810 ;Vertical Blank Interrupts
1820 ;vector through here.  We check
1830 ;to see if a key is being held
1840 ;down. If so, then we determine
1850 ;if it is a cursor control key.
1860 ;If so, then we make it repeat
1870 ;more quickly than OS does.
1880 ;
1890 VBLANK
1900       LDA DBOUNCE ;Debounce logic
1910 ;                  ; in use?
1920       BEQ VBLANK.3 ;No, make next
1930 ;                  ; test
1940       DEC DBOUNCE ;Yes, subtract 1
1950 ;                  ; from timer
1960       BNE VBLANK.1 ;If DBOUNCE<>0,
1970 ;                  ; all done
1980 VBLANK.3
1990       LDA FASTFLG ;Equals $FF if
2000       BMI VBLANK.1 ; not cursor ctl
2010       LDA SKSTAT  ;Bit 3 is on if
2020       AND #4      ; key is still
2030       BNE VBLANK.1 ; held down
2040       LDA #6      ;If timer has
2050       CMP SRTIMR  ; already been
2060 ;                ; set with 6
2070 ;                ; (Fast Moves'
2080       BCS VBLANK.2 ; speed),branch
2090       STA SRTIMR  ;Else, set timer
2100 VBLANK.2
2110       DEC SRTIMR  ;Subtract 1
2120 VBLANK.1
2130       JMP ADDR    ;Addr is changed
2140 ;                ; to OS's VBI
2150 ;                ; routine by INIT
2160 ;
2170 ;FINIS marks the end of pro-
2180 ;tected memory.
2190 ;
2200 FINIS
2210 ;
2220 ;DOS jumps here after auto load-
2230 ;loading Fast Moves. Several
2240 ;addresses within Fast Moves are
2250 ;modified. This routine is not
2260 ;protected as it is needed only
2270 ;once.
2280 ;
2290 INIT
2300       LDA DOSVEC   ;Save DOS vector
2310       STA DO.DOS.V+1
2320       STA DOS3
2330       LDA DOSVEC+1
2340       STA DO.DOS.V+2
2350       STA DOS4
2360 ;
2370       LDA DOSINI   ;Save DOS initi-
2380       STA REINIT+1 ; alization
2390       STA DOS1     ; vector
2400       LDA DOSINI+1
2410       STA REINIT+2
2420       STA DOS2
2430 ;
2440       LDA VKEYBD   ;Save keyboard
2450       STA VKEYBD.SAVE ; handler
2460       STA VKEYBD.L ;    vector
2470       LDA VKEYBD+1
2480       STA VKEYBD.SAVE+1
2490       STA VKEYBD.H
2500 ;
2510       LDA VVBLKD   ;Save VBI
2520       STA VBLANK.1+1 ; routine
2530       LDA VVBLKD+1 ;    vector
2540       STA VBLANK.1+2
2550 ;
2560       JMP INIT2    ;Continue initi-
2570 ;               ; alization
2580 ;Autorun
2590 ;
2600       *=  RUNAD
2610       .WORD INIT
2620 ;
2630       .END
```

game of the month

VAMPIRE RATS

Article on page 49

LISTING 1

Don't type the TYPO II Codes!

```
XM 1 REM VAMPIRE RATS!
PC 2 REM BY TOM ZARBOCK
FF 5 REM (c) 1985, ANTIC PUBLISHING
GX 10 GOTO 22000
AI 5000 REM ACTIONS
LG 5010 S1=STICK(0):S2=STICK(1):F1=AF(F1+
   1+F(S1)):F2=AF(F2+1+F(S2))
IC 5020 REM PLYR 1 NEW FACING?
AP 5030 IF S1>12 THEN 5049
XY 5040 COLOR 10+F1:PLOT X1,Y1
CC 5045 IF STRIG(0)=0 THEN S1=14
JY 5049 REM PLYR 1 MOVES OR JMPS?
AF 5050 IF S1<>14 AND S1<>13 THEN 5074
GM 5055 U=1:IF S1=13 THEN U=2
JS 5060 TRAP 5074:LOCATE X1+S(0,F1)*U,Y1+
   S(1,F1)*U,K
CF 5065 IF K<>32 THEN 5074
PX 5070 COLOR 32:PLOT X1,Y1:X1=X1+S(0,F1)
   *U:Y1=Y1+S(1,F1)*U:COLOR 10+F1:PLOT X1
   ,Y1:POKE 53761,10:POKE 53761,0
ED 5072 B1=B1-2*(S1=13)
IM 5074 REM PLYR 1 BITES? & WHO?
YB 5080 LOCATE X1+S(0,F1),Y1+S(1,F1),K
CA 5085 IF K>183 AND K<187 THEN V1=10:COL
   OR 32:PLOT X1+S(0,F1),Y1+S(1,F1):B1=B1
   +5
XX 5090 IF K>41 AND K<50 THEN B2=B2-2:B1=
   B1+2:POKE 708,156:SOUND 2,18,4,15
KY 5199 REM PLYR 2 NEW FACING?
ZW 5200 IF S2>12 THEN 5219
CS 5210 COLOR 42+F2:PLOT X2,Y2
DM 5215 IF STRIG(1)=0 THEN S2=14
KI 5219 REM PLYR 2 MOVES OR JMPS?
IH 5220 IF S2<>13 AND S2<>14 THEN 5259
GV 5225 U=1:IF S2=13 THEN U=2
RJ 5230 TRAP 5259:LOCATE X2+S(0,F2)*U,Y2+
   S(1,F2)*U,K
FS 5240 IF K<>32 THEN 5259
VP 5250 COLOR 32:PLOT X2,Y2:X2=X2+S(0,F2)
   *U:Y2=Y2+S(1,F2)*U:COLOR 42+F2:PLOT X2
   ,Y2:POKE 53761,10:POKE 53761,0
FI 5252 B2=B2-2*(S2=13)
JT 5259 REM PLYR 2 BITES? & WHO?
BQ 5270 LOCATE X2+S(0,F2),Y2+S(1,F2),K
QJ 5280 IF K>183 AND K<187 THEN V1=10:COL
   OR 32:PLOT X2+S(0,F2),Y2+S(1,F2):B2=B2
   +5
YJ 5290 IF K>9 AND K<18 THEN B1=B1-2:B2=B
   2+2:POKE 709,206:SOUND 3,16,4,15
CW 5350 REM UPDATE BLOOD LEVEL
HZ 5390 REM PLAYER 1
FZ 5400 IF B1>8 THEN COLOR 168:PLOT 0,B1P
   :B1P=B1P-1:B1=B1-8
WZ 5405 IF B1<0 THEN COLOR 41:PLOT 0,B1P:
   B1P=B1P+1:B1=B1+8
AL 5406 IF B1P<0 THEN B1P=0:B1=8
DB 5407 IF B1P>10 THEN F=2:GOTO 9000
JV 5410 COLOR 160+INT(B1+0.5):PLOT 0,B1P
JN 5449 REM PLAYER 2
NW 5470 IF B2>8 THEN COLOR 168:PLOT 19,B2
   P:B2P=B2P-1:B2=B2-8
BQ 5480 IF B2<0 THEN COLOR 41:PLOT 19,B2P
   :B2P=B2P+1:B2=B2+8
CZ 5482 IF B2P<0 THEN B2P=0:B2=8
DA 5484 IF B2P>10 THEN F=1:GOTO 9000
UF 5490 COLOR 160+B2:PLOT 19,B2P
FG 5500 B1=B1-0.1:B2=B2-0.1
ZS 5899 REM RANDOM VICTIMS
LC 5900 IF PEEK(53770)>9 THEN 5940
UH 5910 I=INT(16*RND(0)+2):J=INT(10*RND(0
   )+1):LOCATE I,J,D:IF D<>32 THEN 5910
VK 5920 COLOR INT(3*RND(0))+184:PLOT I,J:
   POKE 77,0
OI 5940 REM SOUNDS
DY 5950 SOUND 1,0,8,V1:V1=V1-2:IF V1<0 TH
   EN V1=0
MJ 5960 SOUND 2,0,8,0:SOUND 3,0,8,0
VQ 5980 POKE 708,150-6*(B2P>8):POKE 709,2
   00-8*(B1P>8):POKE 53768,197
OL 6000 GOTO 5000
NB 9000 REM GAME ENDS
VE 9005 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
    2,0,0,0:SOUND 3,0,0,0:POKE 708,150:PO
   KE 709,200
IP 9030 COLOR 32:PLOT X1,Y1:PLOT X2,Y2
TB 9040 J=10:X=X1:Y=Y1:IF F=2 THEN J=42:X
   =X2:Y=Y2
AY 9050 FOR I=1 TO 15:FOR K=0 TO 7
XH 9060 COLOR J+K:PLOT X,Y:NEXT K:NEXT I:
   RESTORE 9100
FJ 9080 READ I,J:IF I=-1 THEN 9270
YT 9090 SOUND 0,I,10,8:SOUND 1,I+1,10,8:F
   OR K=1 TO J/4:NEXT K:GOTO 9080
RW 9100 DATA 237,100,177,100,140,100,117,
   200,140,100,117,200,140,100,117,200,14
   0,100,177,300,177,500,-1,-1
VA 9270 SOUND 0,0,0,0:SOUND 1,0,0,0
MQ 9275 POSITION 1,0:? #6;"press trig to 
   play":POKE 712,0:POKE 711,6:POKE 710,4

HU 9280 IF STRIG(0) AND STRIG(1) THEN 928
   0
VG 9285 B1P=0:B2P=0
SM 9290 GOTO 25000
VK 22000 REM INITIALIZE
BI 22100 DIM F(15),S(1,7),AF(9)
ML 22190 RESTORE 22205
IA 22200 FOR I=0 TO 15:READ D:F(I)=D:NEXT
    I
QA 22205 DATA 0,0,0,0,0,1,1,1,0,-1,-1,-1,
   0,0,0,0
AT 22210 FOR I=0 TO 1:FOR J=0 TO 7
VO 22220 READ D:S(I,J)=D:NEXT J:NEXT I
SL 22230 DATA 0,1,1,1,0,-1,-1,-1
TH 22240 DATA -1,-1,0,1,1,1,0,-1
XW 22250 FOR I=0 TO 9:READ D:AF(I)=D:NEXT
    I
VA 22260 DATA 7,0,1,2,3,4,5,6,7,0
ZM 23000 GOTO 27000
PX 25000 REM CUSTOM CHARACTER SET
RO 25005 IF PEEK(1536)<>0 THEN CHBASE=PEE
   K(1536)*256:GOTO 25150
MP 25010 CHBASE=(PEEK(742)-4)*256:POKE 74
   2,PEEK(742)-5:POKE 1536,CHBASE/256:POK
   E 756,CHBASE/256
GC 25080 FOR I=0 TO 511:POKE CHBASE+I,PEE
   K(57344+I):NEXT I:REM MOVE ROM SET
ZW 25120 FOR I=CHBASE+8 TO CHBASE+216:REA
   D D:POKE I,D:NEXT I
KH 25150 GRAPHICS 2+16:POKE 756,CHBASE/25
   6
VV 25160 REM CUSTOM CHARACTER DATA
FL 25170 DATA 0,0,0,0,0,0,0,126
TU 25171 DATA 0,0,0,0,0,0,126,126
PF 25172 DATA 0,0,0,0,0,126,126,126
```

continued on next page

```
RS 25173 DATA 0,0,0,0,126,126,126,126
BH 25174 DATA 0,0,0,126,126,126,126,126
RY 25175 DATA 0,0,126,126,126,126,126,126
PR 25176 DATA 0,126,126,126,126,126,126,1
   26
UM 25177 DATA 126,126,126,126,126,126,126
   ,126
ZX 25178 DATA 0,0,0,0,0,0,0,0
NY 25180 DATA 40,56,40,146,124,56,124,130
WG 25190 DATA 4,40,37,154,120,118,48,8
OX 25200 DATA 136,80,119,122,119,80,136,0
NO 25210 DATA 8,48,118,120,154,37,40,4
ZK 25220 DATA 65,62,28,62,73,20,28,20
GR 25230 DATA 16,12,158,30,89,164,20,32
RF 25240 DATA 0,17,10,238,94,238,10,17
VG 25250 DATA 32,20,164,89,30,110,12,16
QR 25280 DATA 0,127,68,68,79,124,75,74
RG 25290 DATA 0,255,34,34,255,72,255,0
DN 25300 DATA 0,254,34,34,250,30,234,74
XS 25310 DATA 74,74,78,74,122,74,78,122
DB 25320 DATA 74,202,46,26,250,18,254,0
BD 25330 DATA 74,75,122,76,79,72,127,0
BH 25340 DATA 108,84,254,68,124,126,219,2
   15
WW 25350 DATA 12,24,48,113,127,63,99,0
LG 25360 DATA 12,138,207,252,254,124,40,1
   08
TE 25370 DATA 0,69,213,247,127,62,0,0
KS 26000 REM DRAW ARENA
EJ 26005 POKE 708,150:POKE 709,200:POKE 7
   10,240:POKE 711,208:POKE 712,2:B1=8:B2
   =8
HQ 26010 COLOR 146:PLOT 1,0:COLOR 147:DRA
   WTO 17,0:COLOR 148:PLOT 18,0:COLOR 149
   :DRAWTO 18,10
LX 26020 COLOR 150:PLOT 18,11:COLOR 147:D
   RAWTO 2,11
ZD 26030 COLOR 151:PLOT 1,11:COLOR 149:DR
   AWTO 1,1
AU 26040 COLOR 8:PLOT 0,11:COLOR 40:PLOT
   19,11
UB 26050 COLOR 168:PLOT 0,10:DRAWTO 0,0:P
   LOT 19,10:DRAWTO 19,0
SI 26060 X1=5:Y1=5:X2=14:Y2=5:COLOR 10:PL
   OT X1,Y1:COLOR 42:PLOT X2,Y2:GOTO 5000
PA 27000 REM TITLE SCREEN
DO 27010 GRAPHICS 2+16:POKE 708,48:T=5
WL 27011 SOUND 0,250,10,10:SOUND 1,251,10
   ,10:SOUND 2,252,10,10:K=4
NQ 27020 FOR X=1 TO 18:COLOR 42:PLOT X,0:
   DRAWTO 19-X,11:POKE 710,PEEK(53770)
JT 27025 POSITION 3,5:? #6;"VAMPIRE RATS
    ":IF  NOT STRIG(0) OR  NOT STRIG(1) T
   HEN 27100
HF 27030 COLOR 0:PLOT X,0:DRAWTO 19-X,11
NM 27040 NEXT X
XJ 27050 FOR Y=1 TO 10:COLOR 42:PLOT 19,Y
   :DRAWTO 0,11-Y:POKE 710,PEEK(53770)
ZE 27052 POKE 53768,K:J=J+1:IF J=40 THEN
   J=0:K=4*(K<>4)+6*(K<>6)
WA 27055 COLOR 0:PLOT 19,Y:DRAWTO 0,11-Y
QW 27056 POSITION 3,5:? #6;"VAMPIRE RATS
    ":IF  NOT STRIG(0) OR  NOT STRIG(1) T
   HEN 27100
MY 27060 NEXT Y:GOTO 27020
AW 27100 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUN
   D 2,0,0,0:POKE 710,50:GOTO 25000
DS 27200 RETURN
```

ST SOUND

Article on page 16

LISTING 1

```
/*   b:Sound.c                    */
/*   by Patrick Bass              */
/*   (c) 1985 Antic Publishing */

#include  "portab.h"
#include  "obdefs.h"
#include  "define.h"
#include  "gemdefs.h"
#include  "osbind.h"

        int     contrl[12], intin[256], ptsin[256], intout[256], ptsout[256],
                l_intin[20], l_ptsin[20], l_out[100],
                handle, xres, yres,
                i, mx, my, loop, dummy, key_state, port_state,
                x_note, y_note,
                write_command=128, read_command=0, volume=8,
                chana_lo=0, chana_hi=1,
                chanb_lo=2, chanb_hi=3,
                chan_enable=7, chana_volume=8, chanb_volume=9,
                x_note_line=80, y_note_line=100, volume_line=120,
                question_column=15, answer_column=115, twelve_bits=4096,
                hi_mask=0x0F00, lo_mask=0x00FF, pointing_finger=3,
                off=0, thick=1, skewed=4, underlined=8;

        char    note_lo, note_hi, buffer[80],
                copyright[]=" copyright 1985 Antic - the ATARI Resource.";

        double  m_state, number1, number2, number3;

        extern  double  giaccess();

main()
{
        appl_init();

        handle=graf_handle( &dummy, &dummy, &dummy, &dummy );
        graf_mouse( pointing_finger, 0x0L );

        for( i=0; i<10; l_intin[ i++ ]=1 ); l_intin[10]=2;

        v_opnvwk( l_intin, &handle, l_out);
        xres=l_out[0]; yres=l_out[1];

        vst_effects( handle, skewed ); vst_color( handle, BLUE );
        v_gtext( handle, 10, 20, "Antic- The ATARI Resource." );

        vst_effects( handle, thick ); vst_color( handle, GREEN );
        v_gtext( handle, 30, 40, "'Sound Mouse'" );

        vst_effects( handle, underlined ); vst_color( handle, MAGENTA );
        v_gtext( handle, question_column, x_note_line, " Channel A: " );

        vst_effects( handle, underlined ); vst_color( handle, LMAGENTA );
        v_gtext( handle, question_column, y_note_line, " Channel B: " );

        vst_effects( handle, off ); vst_color( handle, YELLOW );
        v_gtext( handle, question_column, volume_line, "    Volume: " );

        Giaccess( volume, chana_volume+write_command );
        Giaccess( volume, chanb_volume+write_command );
```

continued on next page

```
    port_state=Giaccess( port_state, chan_enable+read_command );

    Giaccess( 60, chan_enable+write_command );

    do
   {
           vq_key_s( handle, &key_state );

           if ( key_state & K_CTRL )
                { volume++ ; for( loop=0; loop<500; loop++ ); }
           if ( key_state & K_LSHIFT )
                { volume-- ; for( loop=0; loop<500; loop++ ); }

           if ( volume > 15 ) volume=15;
           if ( volume < 0 ) volume=0;

           Giaccess( volume, chana_volume+write_command );
           Giaccess( volume, chanb_volume+write_command );

           vq_mouse( handle, &m_state, &mx, &my );
           x_note = ( mx * ( twelve_bits / ( xres+1 )));
           note_hi = ( x_note & hi_mask ) >> 8;
           note_lo = ( x_note & lo_mask);
           Giaccess( note_lo, chana_lo+write_command );
           Giaccess( note_hi, chana_hi+write_command );

           y_note = ( my * ( twelve_bits / ( yres+1 )));
           note_hi = ( y_note & hi_mask ) >> 8;
           note_lo = ( y_note & lo_mask );
           Giaccess( note_lo, chanb_lo+write_command );
           Giaccess( note_hi, chanb_hi+write_command );

           number1 = x_note;
           ftoa( number1, buffer, 0 ); buffer[79] = 0;
           vst_effects( handle, underlined ); vst_color(handle, MAGENTA );
           v_gtext( handle, answer_column, x_note_line, buffer );

           number2 = y_note;
           ftoa( number2, buffer, 0 ); buffer[79] = 0;
           vst_color( handle, LMAGENTA );
           v_gtext( handle, answer_column, y_note_line, buffer );

           number3 = volume;
           ftoa( number3, buffer, 0 ); buffer[79] = 0;
           vst_effects( handle, off ); vst_color( handle, YELLOW );
           v_gtext( handle, answer_column, volume_line, buffer );
   }
   while( m_state == off );

   Giaccess( off, chana_volume+write_command );
   Giaccess( off, chanb_volume+write_command );
   Giaccess( port_state, chan_enable+write_command );

   v_clsvwk( handle );
   appl_exit();
}
```

FAST MOVES

Speedy cursor and keyboard repeats

by PATRICK DELL'ERA

Learn how to change the keyboard repeat rate on your Atari XE or XL. Or speed up the cursor on any *Atari 8-bit model. Disk drive required. The BASIC program creates an AUTO-RUN.SYS autoloading file. Source code is included for your instruction, but you don't have to be an assembly langage programmer to use Fast Moves.*

The Atari operating system lets you repeat every key automatically by holding it down. There are two important elements in key repeats. First is how long you must hold the key down before it begins to repeat, which is also called "debounce." Second is how quickly the key repeats after it gets started, which is the "repeat rate."

DEBOUNCE & RATE

Atari owners with XL or XE computers can change either or both of these variables. Location 729 (decimal) holds the debounce value. Dividing that number by 60 tells you how many seconds the debounce value is. You can POKE any number here to change the debounce.

The rate at which the key repeats is held in location 730 (decimal). You can also change this rate by POKEing any number you want.

FAST MOVES

If you don't own an XE/XL series Atari computer—or you'd like to change *only* the cursor rate—try Fast Moves. Unlike the XE/XL PEEKs and POKEs, this program lets you speed up the repeat rate for cursor movement only. After all, how often do you type a long string of any single character?

Fast Move's debounce is just long enough to allow the average typist time to comfortably move the cursor one space. However, continue holding the key and the cursor will really take off! And, yes—it works on XE/XL models as well as 800/400 Ataris.

TYPING IT IN

Type in Listing 1, check it with TYPO II and SAVE a copy. (**Antic** disk subscribers will find this program under the filename FASTMOVE.BAS.) Place a formatted disk with DOS 2 or DOS 2.5 into Drive 1.

Now RUN Fast Moves. It will create an AUTORUN.SYS file on your disk. If there already is such a file, Fast Moves will let you know. If you decide you don't want to replace your existing file with the Fast Move autoloader, just put in another disk with DOS 2 or DOS 2.5. Or, you could press [BREAK] and go to DOS to create the needed disk.

A few moments after you have RUN Fast Moves, your computer will reboot itself. This loads the AUTORUN.SYS you've created. Now Fast Moves is in control of your cursor movement!

Fast Moves is "persistent," which means that pressing [RESET] doesn't harm it in any way. You'll still have the quickest cursor in town! Whenever you want to use the fast cursor movement, just boot the disk with the Fast Moves AUTORUN.SYS on it.

Listing 2 is a highly commented MAC/65 assembly language source code. It is presented here for your information and does not need be typed in. **Antic** disk subscribers will find it in LISTed form under the filename FASTMOVE.M65.

*Patrick Dell'Era is the machine language whiz who wrote **Antic's** Picture Show (April, 1985) and Fader II (May, 1985). Coming soon from Patrick, the DOS 2.5 adaptation of Dr. Bernard Oppenheim's popular DISKIO (January, 1985).*

Listing on page 62

DIGITAL VISION

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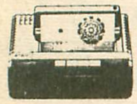
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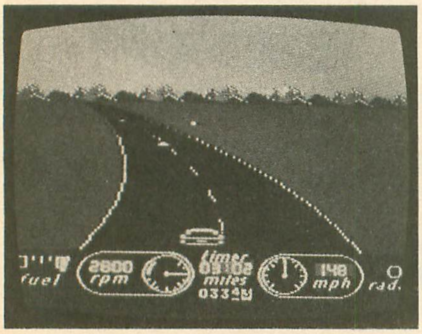
Prepaid orders over $50 receive free shipping, UPS, continental U.S. No waiting period when paid by credit card, certified check or money order. Add $2 shipping and handling on orders under $50. Add $5 for COD orders. $15 minimum for VISA/MC. Hardware requires additional freight charges. Ohio residents add 5.5% sales tax. All items subject to availability and price change. WE CHECK FOR STOLEN VISA & MC.

product reviews

GREAT CROSS-COUNTRY ROAD RACE

Activision, Inc.
P.O. Box 7287
Mountain View, CA 94039
(415) 960-0410
$24.95, 48K disk

Reviewed by Jack Powell



Okay, this game's terrific! And I'm not even a big fan of Pole Position, which has been considered the top Atari auto racing game. I appreciate Pole Position's driving simulation, but I get bored with the scenery. It's a little like driving through the Midwest. How many cornfields can you watch before you start gobbling No-Doz and fiddling with the CB dial?

The Great Cross-Country Road Race is the Ferrari Dino of race games. It's got variety, clever illusions, and attention to detail. Designer Alex DeMeo should be congratulated for this tour de force.

You start off choosing your route across the U.S. A map then appears showing where you are and what city you're headed for. Road conditions flash across the screen. Press [START] and you're off on the first leg of the journey.

Now you're in a screen much like Pole Position—a three-quarter overhead view of your racer and the road stretching to the horizon. Similarities end there, however. You have a four-shift vehicle which is monitored by the dashboard tachometer and the sound of the engine whine. Rev it too high and you burn out your engine.

This is a long trip, so you'd better watch your gas gauge. There are gas stations along the way, but if you run out you must push your car to the next pump.

The scenery on the horizon varies depending on the part of the country and time of day. You might see mountains or power lines or forests. When night falls, your vision narrows and the cars ahead are nothing but glowing tail-lights. At times you're driving through fog or snow. I especially like the muffled sounds while driving through the snow.

When you reach a city, it looms on the horizon looking a little like its namesake. Detroit, for example, has a billboard with a car, and St. Louis displays the famous Arch.

Refreshingly, there's none of the arcade mentality, crash-and-burn-then-resurrect cycle that other racing games rely on. In G.C.C.R.R., your opponent is time. If you run into another car, you don't burst into flames. You simply come to a stop at the side of the road and lose valuable time.

The wealth of details—both graphics and sound—all contribute toward a full, believable environment. You won't have any problem losing yourself in this game. This is one of the better releases of the year.

ANKH

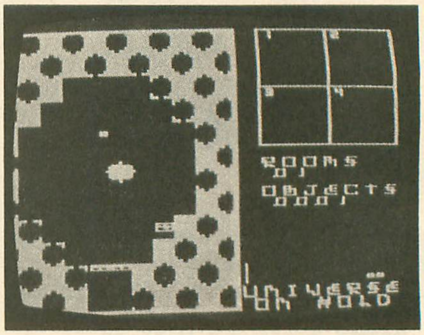
Datamost
19821 Nordhoff Street
Northridge, CA 91324
(818) 709-1202
$19.95, 48K disk

Reviewed by Jack Powell

When I was a child, I bought a puzzle box in Chinatown. It was lacquer-shiny and inlaid with all sorts of colorful, cryptic symbols. And to open it up, you had to find these hidden panels and slide them up, right, down, and in just the right combination before the top slid back.

ANKH from Datamost is a little like that Chinese puzzle box. It's called an "Adventure in the MetaReal World" but it's really more of a graphic puzzle than an adventure.

You control a strange little four-color blimp, described in the documentation as your "other." The object is to explore all 64 rooms in the game. And to do this, you have to solve various puzzles by opening doors and picking up objects. A large part of the challenge is figuring out just what the puzzles are.



There are a few meanies to avoid in some of rooms. You can shoot them, or outrun them. They're really not that dangerous, the main thing is the puzzle factor.

And you must always watch your Karma. It's the green line on the right of the screen.

If this doesn't sound like your usual computer game, you're right. It's different. In philosophical tone, it's a little like **Lifespan** from the Antic Arcade Catalog. Game play, however, is closer to **Sir Galahad and the Holy Grail**.

The documentation is purposely vague. It really can't say much without spoiling the game. A flyer was included in the package, however, which takes the player, step by step, through the first few puzzles.

Datamost probably added this after their phone started ringing off the hook.

The ambiguity can get pretty frustrating. When the game begins, you're presented with arrows pointing right and left, and the word "CHOOSE." Choose "right" and you begin what appears to be the main game. Choose 'left', however, and you end up playing around with what seems to be a pointless character-graphics screen. I've gone both directions and made it through 54 of the 64 rooms, but I still haven't figured out what's going on in the "left" area. It's mentioned nowhere in the documentation. Perhaps it's a meditation room.

ANKH is not an action game. There's plenty of time to sit in one room and think about your next move. Some solutions require coordination, but most require experimentation and abstract reasoning.

If you like puzzles, this is your kind of computer game. I like puzzles.

SIMAX VIDEO SIGNMAKER

Jack Bellis
2013 Green Street, 3F
Philadelphia, PA 19130
$69.95, 48K disk

Reviewed by Brad Kershaw

Simax is an outstanding business display program for the Atari. In fact, **Antic** used Simax for our booth display at the Consumer Electronics Show in June and the presentation was a real hit.

Simax makes it quick and easy to create colorful, eye-catching signs and animation-style displays for in-store video viewing. The program is operated entirely by menu, so you don't need to be a programmer to get professional results. Almost all features can be selected with a single keystroke.

There's a choice of 128 Atari colors —up to nine colors onscreen at one time. The graphics editor uses Atari's mode 10, permitting very nice effects on a high-resolution 80 x 192 screen.

Animation effects are created by swapping any of the nine screen colors in a choice of patterns and timing. Your finished display can be transferred to videotape.

Simax's main menu options are: Edit, Load Screen, Save Screen, Delete Screen and Run Show. Each of these options takes you to a submenu where the specific work is done. The program is self-prompting and will not allow you to press an incorrect key.

You can choose between four types of displays: regular-print text, large-print text, moving headline banner, or a graphics screen created with the built-in graphics editor. Simax also has a built-in clock which will display the time in a header that can hold as many as 99 small characters.

You are allowed five text screens, plus one graphics screen. You can specify the display order and timing. You can place text on a graphics screen and vice versa. The graphics editor is similar to other painting programs on the market today. You choose the color, brush size and special patterns from menus.

You can choose among six borders: squares, circles, small circles, asterisks, a solid border, or no border. Any of the border characters can be set to rotate at a speed you choose.

Simax is an excellent product for store owners to display special promotions. Simax should pay for itself many times over if used in high-traffic areas.

MINDWHEEL

Synapse Software
(Distributed by Broderbund)
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
48K disk (2 drives required)
$39.95

Reviewed by Harvey Bernstein

When Synapse invited **Antic** for a sneak preview of their forthcoming

continued on next page

product reviews

"electronic novel" adventure game **Mindwheel** a year ago, excitement reigned supreme. Unfortunately the finished product has turned out to be a major letdown.

In all fairness, the plot of Mindwheel has potential. Civilization is about to fall apart and it is up to you to recover the Wheel of Wisdom—the one object that can hold things together. To do so, you have to travel through the minds of four dead folkheroes: an assasinated rock star, a poet, a fascist general, and a great scientist.

Each mind is populated by its own set of characters and puzzles. Some of the puzzles are unique, requiring you to do things like solve riddles or finish poems, rather than the usual manipulation of objects.

In spite of some good points, however, I cannot recommend Mindwheel for several reasons. For one thing, it is s-l-o-w. Constant disk accessing means that the text is updated at a snail's pace. There is also no prompt to tell you when the program is through accessing the disk, so you are never quite sure when to input your next command.

If you try typing something in during access (which you can do thanks to a handy vertical blank interrupt), odds are that letters will be dropped. I wasted countless minutes re-entering commands that were messed up through no fault of my own.

However, my biggest complaints about Mindwheel don't come from operating bugs, but from bad writing and sloppy game design. Mindwheel goes overboard on purple prose, apparently trying unsuccessfully to imitate the famous Infocom style. The Thug character (a punk Richard Nixon) threatens to give you a ketchup nose. A ketchup nose?!

Many events that should not repeat themselves do. For example, you enter a room and a character asks if you have a book with you. You give the book to the character and she writes something down. No problem, except that *every* time you enter the room you must repeat the exact same sequence of events! This sort of thing happens repeatedly.

But the worst offense is that Mindwheel is EASY! Characters are forever handing you clues without being asked. An experienced adventurer will be able to finish the game in three or four sessions. A novice might take a week or two. Not much value for your $40.

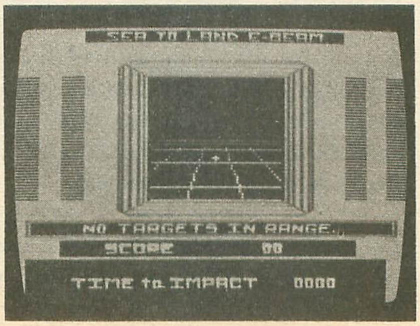
By the way, Mindwheel requires *two* disk drives. Is it worth buying a second drive for? Absolutely not! Is it worth buying to play with a friend who can bring over a second drive? Perhaps, if you've never had any luck with Infocom adventures, want to try something simpler and have $40 burning a hole in your pocket. As for me, I'll wait for Zork IV.

By the way, if you own a 130XE you should know that the program makes use of the extra RAM, but takes forever to load and doesn't seem to speed up the game noticeably.

FINAL LEGACY

Atari Corp.
1196 Borregas Avenue
Sunnyvale, CA 94088
(408) 745-2000
29.95, 16K cartridge

Reviewed by Andre Persidsky



Even though nuclear war turned most of the world into a Dead Zone 50 years ago, a group of "Patriarchs" (the good guys) survives in frozen Antarctica. There's just one problem. Intercepted radio communications reveal that the automated missile stations of the "Warmongers" have managed to complete their own programming and are readying to attack.

In **Final Legacy**, a 1984 game just now being released by Atari, you are in command of the deadly new Legacy battleship. You must sail into the Dead Zone, destroy all enemy missile sites, and protect your home cities.

You begin each game with the Navigation screen. It's a wide-ranging map showing your eight cities and the randomly distributed missile sites. Two types of enemy ships are constantly pursuing and attacking your Legacy ship. To fight an enemy ship, you switch to Torpedo mode. This gives you a 360-degree scanner view of your bow and the approaching enemies.

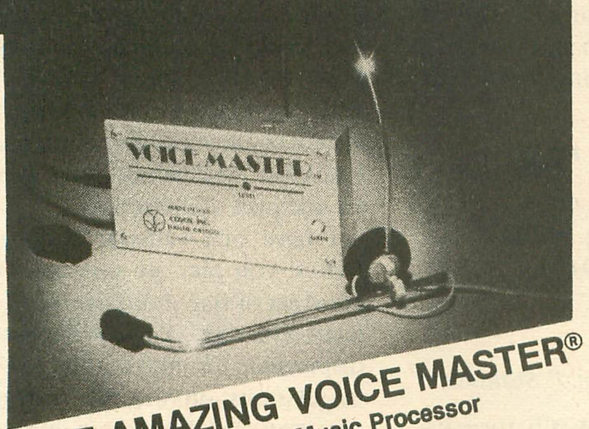
An enemy missile site is destroyed in the Sea-to-Land mode. Here you have a window which displays mobile missile launchers moving about. To destroy them you press the fire button while they are directly centered in your sights.

The enemy will send missiles toward your cities as soon as you attack one of their sites. A clock tells you how much time you have before the missiles destroy your city. To intercept them you use the Sea-to-Air mode where you have a satellite view of the missiles.

I found this part of the game the most challenging, especially on the harder levels where the missiles move faster and faster. When all missile sites have been destroyed you will gain bonus points for your surviving cities and then go on to the next round.

continued on page 78

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continued from page 76

Final Legacy offers six levels of play. The higher a level, the more enemy ships and missile sites you will encounter. The different graphics screens are quite inventive and the sound warnings are effective. The 8-page manual is very good.

In some ways this game reminds me of a more advanced **Missile Command**. The new game's main problem is that it lacks strategy and tends to become a little repetitious. But overall, Final Legacy is quite entertaining. It demands alertness and quick responses, and is a worthy successor to the great tradition of Atari action games.

CHOPPER HUNT

Imagic
981 University Avenue
Los Gatos, CA 95030
(800) 654-7340
32K disk
$19.95

Reviewed by Jack Powell

I don't want to take much space reviewing this throwback, but **Antic** has a certain obligation to warn readers against junk products. **Chopper Hunt** would make a very nice public domain game and might have been seriously considered as a professional program when the Atari 800 was just a twinkle in Nolan Bushnell's eye.

You move a slow, blocky helicopter back and forth across a crude, blocky screen, bombing holes in the ground so you can get to the flashing grey squares. Meanwhile, a slow, blocky enemy airplane flies back and forth dropping slow, blocky "dirt balls". I had to look twice to make sure my BASIC cartridge was not in the machine slowing down the action.

If you plunk down your hard-earned money for this outdated arcade game, you are helping prove that Barnum was right to say, "There's a sucker born every minute." The circus has come to town and you are in the center ring wearing funny hair.

REFORGER '88

Strategic Simulations, Inc.
883 Stierlin Rd, Bldg. A-200
Mountain View, CA 94043
(415) 964-1200
$59.95, 48K disk

Reviewed by Dr. John F. Stanoch

Ever since the end of WWII, there has been constant tension along the border between East and West Germany. It is here that the two superpowers have deployed their most advanced war technology. SSI's new **Reforger '88** is an operational-level game of NATO defense against a combined Soviet and East German thrust through the Fulda Gap into the American-defended sector of West Germany.

To win, the Soviet player must gain as many victory points as possible, while the NATO player must hold down the number of points given up. Points are awarded to both players for enemy unit destruction and possession of West German cities. However, once a NATO city has been overrun, the NATO player can not regain victory points for recapturing it. The Soviet player receives a substantial bonus for capturing the main U.S. Airbase at Frankfurt. The NATO point total is subtracted from the Soviet total to arrive at the final score.

In the solitaire mode, the computer ably controls Soviet forces. Units are combined into combat groups that can be combined or split apart at the start of a turn. Orders are given and then all movements and combat are simultaneously executed.

To win, airpower must be successfully integrated with ground troops. Adequate anti-aircraft defense is also necessary. Enemy combat groups are displayed only if adjacent to a friendly combat group or sighted by friendly air recon missions. Many times, my NATO forces were unpleasantly surprised to find a few Soviet armor combat groups racing toward Frankfurt, well behind what seemed an adequate defense line!

I have one valuable suggestion. Before you play, go out and buy a good set of fine-point overhead projection markers. These will prove indispensible for marking the position of all units on the SSI plasticized data/map card. It is next to impossible to competently play Reforger '88 without an overview map in front of you. Many times, since the screen displays only a fraction of the entire scrolling map, a player may forget what one combat group was ordered to do on one section of the map.

Although Reforger '88 is a complicated game, its excitement is well worth the effort. I recommend this game to any advanced wargamer. But keep a cold drink available, you will probably work up a sweat playing it.

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new products

SYNCALC TEMPLATES

(software)
Synapse & Broderbund
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
$19.95, 48K disk

Users of **SynCalc**, the well-known spreadsheet program, can now save hours of time in creating applications. Twenty-two common applications are included on the disk, ranging from a checking account register to cost analysis of buying versus renting a home. The disk also illustrates the basic techniques of modifying the templates for specific applications.

COLONIAL CONQUEST, PANZER GRENADIER

(software)
Strategic Simulations, Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043
(415) 964-1353
$39.95 each, 48K disk

Up to six people can play **Colonial Conquest**, a strategy game about the struggle for world dominance between Germany, France, England, Japan, Russia and the United States 100 years ago. Roger Damon's **Panzer Grenadier** is a WWII strategy depicting the platoon/company warfare between the Germans and the Russians on the Eastern front.

TYPESETTER

(software)
XLent Software
P.O. Box 5228
Springfield, VA 22150
(703) 644-8881
$34.95, 48K disk

A graphics program with a difference, **Typesetter** gives you total graphics freedom in preparing any page. It allows you to mix type styles, width and height; to print forward, reverse, up, down and overlays. It comes in two versions on the Atari disk, one for the larger memory of the 130XE and the other for the remaining 8-bit Atari models.

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HALLEY PROJECT

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Northbrook, IL 60062
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(software)
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Raleigh, NC 27614
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$39, 48K disk

Programming tools that create source code to develop assembly language programs. Requires printer, word processor, knowledge of 6502 machine language and Atari internal architecture. Includes software, 70-page manual, 17-source sample program.

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(online service)
1616 Anderson Road
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(703) 734-7500

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(home control system)
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(home security system)
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(software)
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An electronic medieval interactive text adventure. This latest "electronic novel" takes the knights of the round table on a quest into hell.

ELITE PERSONAL ACCOUNTANT

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Elite Software
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(software)
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The Write File is an integrated word processor and database manager. **Your Home Office** is the same integrated word processor with a spreadsheet. Team Mate ($49.95) combines both of these along with a business graphics system.



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Houston Instruments
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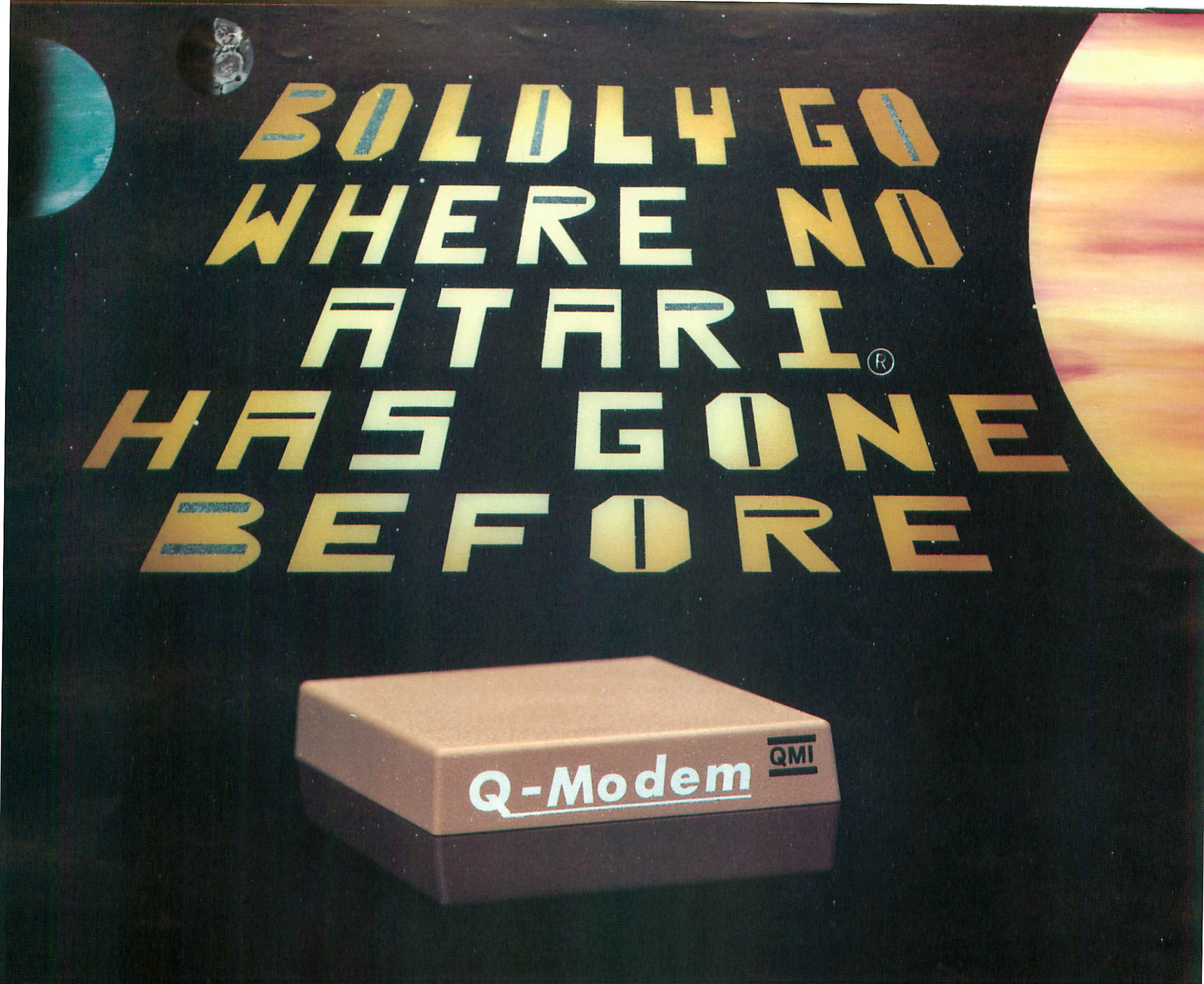
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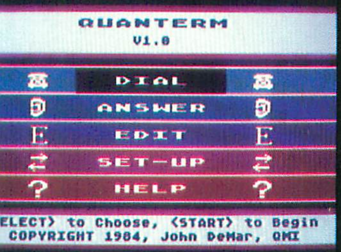
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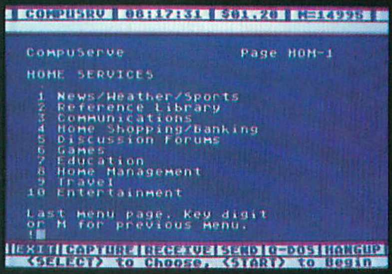
You won't have any trouble finding Halley's Comet during its 1985-6 visit. Input your location and time of observation. The program returns coordinates, predicted brightness, where on the horizon to look and how high up.

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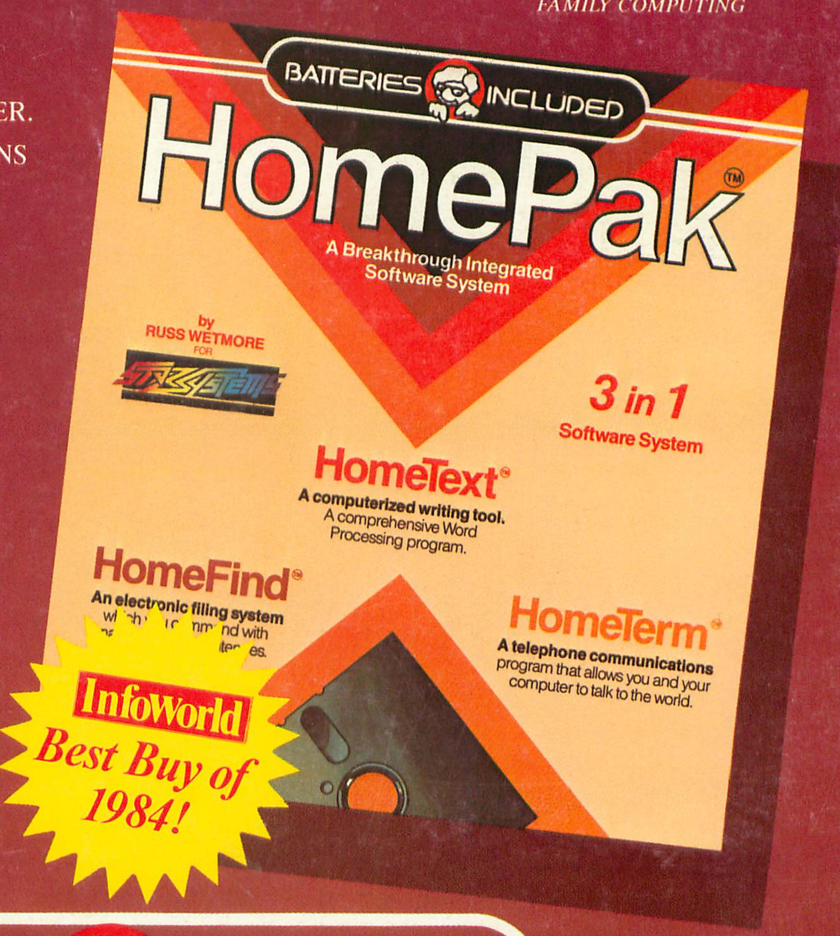
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